

Community Drug Management for Childhood Illness

*Senegal Assessment
September 2002*

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ACRONYMS

AED	Academy for Educational Development
AMR	antimicrobial resistance
ARI	acute respiratory infection
BASICS	Basic Support for Institutionalizing Child Survival [project]
C-DMCI	Community Drug Management for Childhood Illness
C-IMCI	Community Integrated Management of Childhood Illness
DAN	Division de l’Alimentation et de la Nutrition
DHS	Demographic and Health Survey
DMCI	Drug Management for Childhood Illness
DPM	Direction de la Pharmacie et du Médicament
DSSP	Direction de Soins de Santé Primaire
EDL	essential drugs list
ENDA	Environmental Developmental Action in the Third World (Environnement et Développement du Tiers-Monde)
ESIS	<i>Enquête Sénégalaise sur les Indicateurs de Santé</i>
IDB	International Data Base (U.S. Census Bureau)
IMCI	Integrated Management of Childhood Illness
KPC	knowledge, practices, and coverage
MICS	multiple indicator cluster survey
MoH	Ministry of Health (Ministère de la Santé, de l’Hygiène et de la Prévention)
MSH	Management Sciences for Health
NGO	nongovernmental organization
ORS	oral rehydration salts
PIC	<i>paquet intégré de communication</i>
PNA	Pharmacie Nationale d’Approvisionnement (central medical stores)
PRA	Pharmacie Régionale d’Approvisionnement (regional medical stores)
RPM Plus	Rational Pharmaceutical Management Plus [program]

S/P	sulfadoxine/pyrimethamine
SSSP	Superviseur de soins de santé primaire
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
USD	U.S. dollar
XOF	Communauté Financière Africaine franc (unit of currency)
WHO	World Health Organization

EXECUTIVE SUMMARY

In their efforts to reduce childhood mortality, child survival programs recognize the importance of identifying and treating sick children early and appropriately in the community, to prevent the deterioration of cases and thereby reduce mortality. The availability, appropriate management, and rational use of drugs are critical to the successful implementation of the Integrated Management of Childhood Illness (IMCI) strategy. Because the majority of cases are not treated in health facilities, but rather in the home or by private drug providers, efforts should focus on ensuring that correct treatment is available near the home and that families seek, obtain, and appropriately use essential drugs, whether from public or private sources.

As a follow-on to the recent assessment of drug management for childhood illnesses in Senegal by the Rational Pharmaceutical Management Plus (RPM Plus) program, which focused primarily on the public sector health facilities, the Ministry of Health (MoH) of Senegal, in collaboration with RPM Plus and the Basic Support for the Institutionalizing Child Survival (BASICS) II project, conducted an assessment using a newly developed Community Drug Management for Childhood Illness (C-DMCI) assessment tool. Although the questionnaires had been field-tested, the sampling and survey methodology was being used for the first time. The survey took place between August and October 2002 in Kaolack and Thiès Districts.

The principal aims of the C-DMCI survey in Senegal were to—

1. Identify the strengths and weaknesses of community drug management for childhood illnesses in Thiès and Kaolack Districts
2. Orient the development of interventions, planning of activities for Community Integrated Management of Childhood Illness (C-IMCI), and even national drug policies targeting childhood illnesses
3. Determine how well the training approach, instruments, sampling procedures, analysis, and related processes worked to inform the final revisions of the tool

The study was conducted in 20 randomly selected sites (both urban and rural) in each district. School teachers serving as data collectors used questionnaires to conduct interviews in households with caregivers of recently sick children under the age of five years and with health care providers and drug sellers in the communities sampled. Children included in the sample had been sick within the last two weeks with symptoms of malaria (fever), pneumonia (fast breathing), non-pneumonia acute respiratory infection (ARI) (cough), and diarrhea, but were recovered. Households were selected randomly, and provider/drug outlet respondents were selected using a combination of purposive and random sampling. Information was gathered from the caregivers on the timeliness of their care-seeking, the places they went for care and drugs, which drugs they obtained, and how they used them. Providers of drugs included in the survey were from public health facilities, community health huts, private clinics and private pharmacies, and boutiques and markets in the informal sector. The providers gave information on their reported prescribing or selling practices, the availability and prices of drugs, their most

commonly sold or dispensed drugs for certain conditions, their dispensing practices, and where they procured their drug supplies. Overall, 300 caregivers were interviewed in each district and about 130 providers in each district.

Main Findings of the C-DMCI Survey

Data were collected on key indicators that relate to the following essential steps of appropriate drug management at the community level—

1. Caregiver recognizes child's symptoms
2. Caregiver seeks timely care from an appropriate source
3. Caregiver obtains appropriate drugs
4. Caregiver uses appropriate drugs correctly in the home

In this document, the study results for each step are presented in turn.

1. Caregiver recognizes child's symptoms

Most caregivers of children with fast breathing and convulsions recognized the severity of their child's illness.

2. Caregiver seeks timely care from an appropriate source

Although most caregivers take appropriate action, this action is not always prompt. Most caregivers of children with fast breathing and convulsions responded appropriately by seeking care outside the home from health facilities and private clinics. Although caregivers sought care promptly (within 24 hours of onset) for cases of convulsions, there was a delay for children with symptoms of pneumonia. Of the cases of fever that were treated, all received drugs within the recommended time frame (i.e., on the first day of symptom onset).

3. Caregiver obtains appropriate drugs

Whether the caregiver obtains appropriate drugs depends on the availability and the affordability of the drugs as well as the knowledge and practices of the health care providers and drug sellers.

The actual availability of drugs ranged between poor and good and showed some variation between districts. For example, more drugs were available in the health huts as well as the informal sector in Kaolack than in Thiès. Availability of chloroquine and co-trimoxazole tablets in general was good: they were present in most types of drug outlets and even in the informal private sector. However, in syrup form these drugs were less available. In contrast, availability of oral rehydration salts (ORS) in the public sector was poor, and ORS were not found at all in private pharmacies. The majority of caregivers perceived that chloroquine and co-trimoxazole were always or at least sometimes available, in line with the availability findings, and around half felt that ORS were available in their locality, more than the actual availability. In particular, awareness of the product ORS appears to be low among the caregivers surveyed.

Another aspect of access is the affordability of drugs, and, in general, most caregivers felt that chloroquine and co-trimoxazole were affordable. Thus, the price of these drugs does not seem to be a barrier. However, very variable costs of drugs were noted across sectors and even between health huts and health posts, as well as between districts.

Caregivers' main sources of drugs were health facilities and private pharmacies. Under half of those caregivers who had used chloroquine to treat their child's illness had it already in the home.

The reported prescribing and dispensing practices of health care providers and drug sellers do not facilitate the caregiver's obtaining the appropriate drugs for a child's symptoms. Many respondents in the provider survey reported a practice of selling antibiotics for cases of cough. Many providers were not familiar with the key symptoms of pneumonia and its recommended treatment, and a few did not recommend the first-line treatment, chloroquine, for malaria. Nonbloody diarrhea was also a subject of poor reported drug recommendations by the providers surveyed.

4. Caregiver uses appropriate drugs correctly in the home

Overall, children were not given the appropriate drug for their symptoms. Nearly a quarter of children with cough had been given unnecessary antibiotics by their caregivers. Only around a fifth of children with pneumonia received co-trimoxazole, the first-line antibiotic in Senegal. Malaria was better managed, but still only about half of those children with fever received a treatment of chloroquine. Uncomplicated diarrhea was very poorly managed by the caregivers: about two-thirds of children received more fluids than usual, and only around a fifth were given ORS. A fifth of cases of uncomplicated diarrhea received antibiotics unnecessarily, whereas less than a fifth of cases of bloody diarrhea were treated with co-trimoxazole, the recommended first-line treatment.

The administration of drugs to the sick children was far from adequate. More than 80 percent of children given chloroquine received it twice a day, and about a fifth received chloroquine for longer than the recommended three days. In nearly half the cases where it was used, co-trimoxazole was given for less than the recommended five days, and very few children (under 25 percent) took it correctly twice a day for five days. Possibly reinforcing these practices, although health care providers and drug sellers were reported as often giving information to caregivers, this information was frequently noted to be insufficient or incorrect.

Conclusions

The survey produced the following main findings, which are listed in the same order as the steps previously mentioned.

- Overall, caregivers have a timely response to fever and convulsions, but they do not seek treatment for fast breathing (the key symptom of pneumonia) in a timely manner.

- In general, there is good availability of certain drugs, such as chloroquine and co-trimoxazole, in the drug outlets studied, but not necessarily at appropriate levels.
- There is not only poor availability of ORS, especially in private pharmacies, but also there is a lack of awareness about ORS among caregivers.
- Most caregivers get drugs for their sick children from the formal sector, implying that intervention efforts (at least for child health) should target this sector.
- Many caregivers are not treating cases of fever with chloroquine; this is more pronounced in the rural areas than the urban areas.
- Caregivers in general do not manage diarrhea well with increased fluids and/or ORS.
- Caregivers give antibiotics to cases of fast breathing rarely, but overtreat cases of ARI cough with antibiotics.
- Caregivers do not administer drugs for the correct length of time or with the correct frequency.
- All of these issues are complemented by poor provider practices, as the health care providers and drug sellers surveyed seem not sufficiently familiar with national standard treatments (standard treatment guidelines) and correct dosing schedules of those drugs.

Although the main problems have been identified, further exploration in some areas is needed in order to develop appropriate interventions. For example, what influences the drugs that caregivers obtain—a prescription, the seller's recommendation, the caregiver's personal choice? After these factors are explored, appropriate messages can be targeted at the community to improve the drug choice and acquisition practices of caregivers.

What influences how the drug is administered to a sick child—the caregiver's own knowledge or experience, information given by the provider, or the fact that the child recovers? For example, the chloroquine twice-daily dosing problem that was identified was an old recommendation that has now been replaced by once-daily dosing. This new dosing message needs to be further disseminated and sensitization expanded because the change is not being implemented by caregivers or providers.

Recommendations

The following recommended interventions have been grouped according to the level or target group. It is suggested to consider which problems are priorities and target interventions that are feasible and that give maximum impact to priority problem areas.

Caregivers

Many interventions need to be targeted at the caregivers in order to change some of their practices in managing their sick children. However, it is important to reinforce some things they are doing well, such as seeking care outside of the home for severe cases of malaria and pneumonia and treating cases of severe malaria in a timely fashion.

As with any behavior-change interventions, it is important to explore more of the influencing factors that may promote certain behaviors. Qualitative methods can be used to obtain this information, keeping the field research contained, practical, and focused on the research questions of interest. Many of the decision makers and program managers in Senegal are expected to understand a lot of the influencing factors and the context because their own family members or friends, or indeed they themselves, are also caregivers and their firsthand knowledge also can help inform the development of interventions.

1. Communicate messages aimed at changing behavior of caregivers through the media, local community groups of village leaders, women's groups, community health workers (*relais*), community organizations, and other mechanisms used by the *paquet intégré de communication* (PIC) as well as by the providers themselves. Some examples of the subjects to be covered are—
 - Danger signs
 - Prompt action and appropriate sources of care
 - Drug availability
 - Management of fever with chloroquine
 - Management of diarrhea and use of ORS
 - Management of fast breathing with an antibiotic (Bactrim)
2. Encourage caregivers, through women's groups and community health workers, to demand instructions from the providers on how to administer the drugs.

Providers

The providers in both the public and private sector are a key point of contact for the caregiver and therefore in a good position to influence to some degree the behavior of the caregiver or at least reinforce some messages. In order for providers to perform this function, some of their own practices need to be improved. These interventions are a mix of training and capacity development through supervision and memory aids in both the public and private sector.

Public Sector

3. Continue to extend the IMCI training of health workers to reach national coverage.
4. Train staff of public health facilities in store management to ensure drug availability, including ORS.

5. Strengthen supervision and the semiannual monitoring by district health teams of health facilities, including the health hut and district stores, to monitor drug availability and use. Use observation as a method to determine whether providers are giving appropriate instructions about drug administration.
6. Improve communication between health workers and caregivers. Work with communication experts to improve verbal communication of drug dosing information and develop a way to write drug dose instructions that will be understood by the community.
7. Integrate messages promoting use and explaining preparation of ORS into other activities of the health post, such as prenatal care.

Private Sector

8. Organize information days for private pharmacists and other health care providers to familiarize them with IMCI guidelines and the national standard treatments.
9. Introduce a regular newsletter or information sheet, produced by the national *ordre* or *syndicat* of pharmacists, to disseminate messages to pharmacists of private pharmacies and their staff.
10. Conduct supervision training or information visits through the *ordre* or *syndicat* of pharmacists, in collaboration with the MoH, and hold regular meetings of local groups of pharmacists to discuss cases and learn through peer review.
11. Conduct training programs through the MoH, in collaboration with the *ordre* and *syndicat*, for pharmacy employees (counter agents) in treatment of common childhood illnesses and their appropriate treatment and doses, especially focusing on misuse of antibiotics and the preparation and use of ORS.
12. Develop and disseminate job aids and posters targeted at pharmacy drug sellers as well as caregivers to show how to administer the medicines. Distribution could take place through the private wholesalers.
13. Motivate wholesalers (including the public sector Pharmacie Nationale d'Approvisionnement [PNA] and district stores) to stock resealable plastic bags for dispensing of drugs.

Policy

Certain interventions can be implemented only at the policy level, in order to facilitate impact on drug management at community level. Some suggestions follow of interventions that the MoH and its partners, including those of the private for-profit sector, could consider.

14. Improve the availability of chloroquine at community level by authorizing and developing the capacity of community health workers (*relais*) to distribute it.

15. Control and harmonize prices in the public sector both between districts and between levels of care.
16. Facilitate the availability of ORS in the private sector and actively promote it through social marketing.
17. Pre-package antimalarials to facilitate dosing decisions by providers and administration by caregivers.
18. Develop an accredited drug outlet system (a level below the pharmacy) where the seller is trained in recommending and selling certain appropriate drugs such as first-line antimalarials, antipyretics, and ORS.

INTRODUCTION

Integrated Management of Childhood Illness

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) collaborated to develop the Integrated Management of Childhood Illness strategy, which aims to reduce global mortality and morbidity for the leading causes of childhood illness—

- Acute respiratory infection
- Diarrhea
- Malaria
- Malnutrition
- Measles

The IMCI strategy helps health workers diagnose these conditions, provide standard treatments and follow-up, and promote preventive measures. Each country that chooses to implement an IMCI program adapts the treatments and guidelines to the local setting to ensure that the most effective and cost-efficient treatment for each diagnosis is available. IMCI consists of three components—

1. Training health workers
2. Strengthening health systems
3. Promoting key family and community practices

To date, worldwide much effort has been applied to the first component—training health staff—and more attention internationally is now focusing on the third component—community IMCI promoting key family and community practices. The second component has in many countries often been neglected.

Drug Management for Childhood Illness

The necessary preconditions for IMCI success in a country are the availability, appropriate management, and rational use of drugs and supplies, which are primarily dependent on the second component of IMCI. These preconditions are not limited only to the public sector, because the majority of childhood illnesses are treated at home with drugs obtained through formal or informal private drug sellers, not just through public health facilities. The inappropriate use of antimicrobial drugs in many of these situations contributes significantly to the increased spread of antimicrobial resistance (AMR). Rational drug use efforts targeting childhood illnesses need to focus on making sure correct treatment is available when and where families seek treatment, and on ensuring that families obtain and appropriately use necessary medicines. Identifying and treating patients early and appropriately in the community helps prevent worsening illness of cases and reduces mortality. However, activities targeting only the public sector will have limited impact because they may not reach households and private sector providers of drugs.

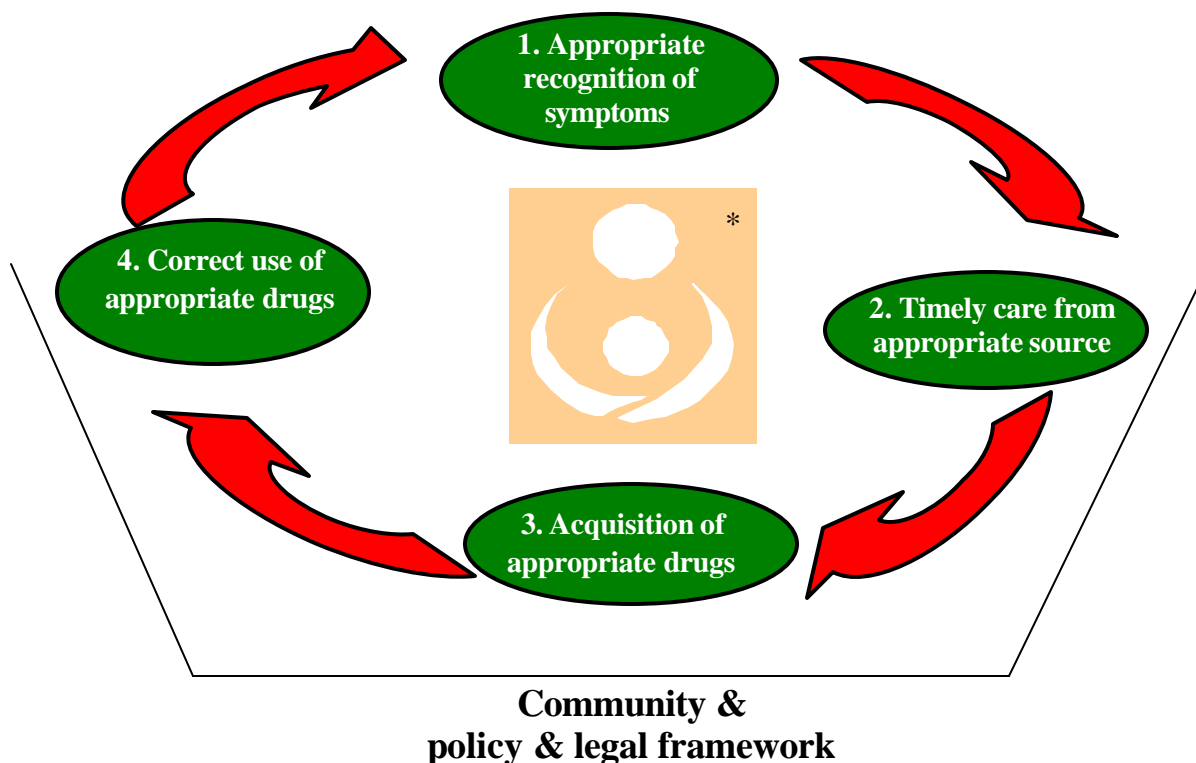
Recognizing the importance of drugs in the case management of childhood illness, the Rational Pharmaceutical Management Project developed and has implemented an assessment tool to evaluate strengths and weaknesses of drug availability and use in the public sector: Drug Management for Childhood Illness. This tool contributes to the second component of IMCI (systems strengthening). However, as previously stated, not all drug management occurs in the public sector. Therefore, as a follow-on, RPM Plus, funded by the U.S. Agency for International Development (USAID), in partnership with the Academy for Educational Development (AED) and Harvard University, is working on the development of a Community Drug Management for Childhood Illness assessment tool for studying the practices of both community household caregivers or patients and those who provide drugs to them. This tool will help district health managers, program planners, and regional or national policy makers in identifying problems in drug management at household and provider levels in the community. The tool's survey questionnaires have been designed for straightforward use and can be administered by local non-health-related community members such as schoolteachers, and the staff of nongovernmental organizations (NGOs). They were field-tested in Zambia in January 2002. Data from these questionnaires can then be analyzed by district health teams, national program staff, or NGO staff. The information from this type of assessment focuses on drug management for childhood illnesses at community levels. Although certain aspects of the assessment are similar to surveys such as the Demographic and Health Survey (DHS) and knowledge, practices, and coverage (KPC) surveys, the C-DMCI is easier to replicate and covers more detailed elements of drug management from the caregiver/household level as well as providers of drugs.

The Community Drug Management for Childhood Illness assessment tool uses an indicator-based approach to identify strengths and weaknesses of community drug management and to provide a systematic method of monitoring the impact of interventions targeting health providers and caregivers for strengthening drug management and use.

A cyclical framework for appropriate community drug management, focusing on the caregiver, is used throughout the tool—

- The caregiver recognizes the child's symptoms.
- The caregiver seeks timely care at an appropriate source.
- The caregiver obtains appropriate drugs.
- The caregiver uses appropriate drugs correctly in the home, that is, according to an appropriate regimen (dose, frequency, duration).

These steps can be represented pictorially as shown in Figure 1. This cycle is loosely based on the drug management cycle (MSH 1997) but has different steps for adaptation to the community situation. The caregiver and the child are at the center of the cycle.



*Symbol from BASICS II. Used with permission.

Figure 1. Framework for appropriate drug management at community level

The provider or drug seller also has responsibilities or must take certain actions in order to allow the caretaker to complete the cycle. The provider—

- Keeps appropriate and affordable drugs
- Determines if the caregiver understands the symptoms and appropriate actions and then educates the caregiver, if necessary
- Assesses symptoms appropriately
- Prescribes, dispenses, or recommends appropriate medicine or refers the caregiver to more-sophisticated health providers
- Provides appropriate information, instructions, advice, and labeling
- Advises on signs of treatment failure and/or need for referral

Health Situation in Senegal

The total population of Senegal, West Africa, was estimated to be 10,284,929 (U.S. Census Bureau International Data Base [IDB] 2000, cited in PHNIP 2002), with a density of approximately 47 persons per square kilometer (ESIS 1999). The population is growing at a rate of 2.9 percent (U.S. Census Bureau IDB 2000, cited in PHNIP 2002). It was estimated in 1990 that 54 percent of the population of Senegal was in absolute poverty (WHO 1999), which puts the population at greater risk of malnutrition and childhood illnesses.

Children under five are about 19 percent of the population according to the MoH. Child and infant mortality figures have fallen over the last 10 years; the infant mortality falling from 72.8/1,000 live births in 1990 to 55/1,000 live births in 2002 and under-five mortality falling from 147.9/1,000 live births in 1990 to 106.7 in 2001 (U.S. Census Bureau IDB 2000, cited in PHNIP 2002). Although other sources cite slightly different figures (e.g., the multiple indicator cluster survey [MICS-II] states that infant mortality in 2000 is 70.1, down from 76 in 1990), the trend is still the same. Despite this decreasing trend, the child and infant mortality rates are still worrying.

According to the Division de l'Alimentation et de la Nutrition (DAN) of the Senegal MoH, the causes of deaths in the under-fives can be attributed to ARI pneumonia (23 percent), diarrhea (21 percent), malaria (9 percent), and measles associated with malnutrition (20 percent). According to the national malaria program, of the children under five years old seen in outpatient consultations and hospital admissions in 2000, malaria accounted for 35 percent of the mortality and 27 percent of the morbidity (personal communications).

The *Enquete Sénégalaise sur les Indicateurs de Santé* (ESIS) (1999) gives an idea of the prevalence of some major childhood illnesses. Of children under five years, 21 percent were found to have had diarrhea in the two weeks preceding the survey. It was estimated that each five-year-old child would have had several episodes of diarrhea, prevalence being greater in rural areas such as Kaolack (ESIS 1999). Of children under five years, 45 percent were found to have had fever (presumed to be malaria in Senegal) during the two weeks prior to the survey (ESIS 1999). Each child is estimated to develop 1.5 to 3 episodes of malaria per year, and malaria is estimated to be responsible for 25 percent of deaths of children age six months to five years. The prevalence of ARI pneumonia is 6.6 percent, and it is higher in the rural areas than in the urban areas (MICS-II 2000).

Because of the high child mortality, especially in rural areas, and its detrimental effect on social and economic development, the MoH has implemented the WHO/UNICEF strategy of IMCI in an effort to increase its effect on reducing child morbidity and mortality. IMCI ensures integration of programs that target children by focusing on the principal causes of child mortality in the under-fives. Much work has focused on the first component of IMCI: competence of health workers. Since 2000, the health workers of several districts have been trained, and IMCI is being implemented and gradually expanded across the country. In addition, the MoH is integrating community health activities targeting family and community practices, which is the third component, or C-IMCI.

One of the objectives of the national strategic plan of health development is reducing child mortality and increasing access to health services by increasing use of primary health care, decentralizing to district levels, developing community activities, and using approaches such as IMCI. The health system is decentralized and consists of three levels in a pyramidal structure: the lowest level consisting of health centers, health posts, health huts and community health workers; the middle layer consisting of 10 regional hospitals and 2 departmental hospitals; and the top level consisting of 7 national hospitals. The rate of increase of the population makes it difficult to ensure coverage of the population by health facilities and inequities in the coverage exist, especially in the poorer rural areas. The private sector in Senegal, which consists of private clinics, dispensaries, and pharmacies, plays a large role in providing health services. An established informal and illicit market for drugs also exists.

Drug Management for Childhood Illness in Senegal

The ability of the health system to function can also be a determinant of the success of IMCI, and the MoH recognized that these health workers could only perform according to their training if the necessary drugs and commodities were available in their workplaces. In 2001, a Drug Management for Childhood Illness (DMCI) survey (Briggs et al. 2002) was conducted by the MoH in collaboration with RPM Plus and BASICS II to evaluate the availability and use of drugs in the management of childhood illnesses and to identify the strengths and weaknesses of the system. The survey studied primarily the public sector and identified problems of distribution of drugs to the peripheral curative facilities, as well as irrational use of drugs, especially antibiotics and particularly in the districts where IMCI had not been introduced. Although some simulated purchases were carried out in private pharmacies to evaluate the sales practices, no information was obtained about the availability of drugs.

As in many African countries, the Senegalese not only frequent the public sector to treat their sick children, but many also treat at home or purchase drugs in the private sector. The private sector in Senegal is composed of private clinics and pharmacies in the formal sector as well as sellers at boutiques, sellers at fixed and weekly markets, and itinerant vendors. Thus, an assessment focusing on the drug management of the public system misses these elements, which may account for a sizable proportion of the sources of drugs used by the community. The behavior of the caregivers in recognizing and treating a sick child as well as the practices of the providers of drugs in the community itself can affect the health outcomes of the child. In order to inform the planning and implementation of C-IMCI in Senegal, the MoH needed data on the drug management practices of communities.

RPM Plus offered technical assistance to the MoH and BASICS II in conducting an assessment using a newly developed assessment tool for community drug management for childhood illness. Although the questionnaires had been field-tested, the sampling and survey methodology was being used for the first time. The survey took place between August and October 2002, including the preparatory phase and analysis, with data collection in Kaolack and Thiès Districts in September 2002.

The principal aims of the C-DMCI survey in Senegal were to—

1. Identify the strengths and weaknesses of community drug management for childhood illnesses in Thiès and Kaolack Districts
2. Orient the development of interventions, planning of C-IMCI activities, and even national drug policies targeting childhood illnesses
3. Determine how well the training approach, instruments, sampling procedures, analysis, and related processes worked to inform the final revisions of the tool

METHODOLOGY

The C-DMCI Assessment Tool

The C-DMCI assessment tool has two main components: one for use at drug outlets or health providers and the other for use at the household level with the primary caregivers of recently sick children.

The household-level component of the tool addresses timeliness of treatment, sources of medication, choice of drugs, appropriateness of drug use, and perceived access to certain drugs. This questionnaire is administered to caregivers of children who experienced fever or convulsions (symptoms of uncomplicated and severe malaria, respectively), cough or difficulty breathing/rapid breathing (symptoms of simple ARI and pneumonia, respectively), or diarrhea (simple and/or bloody) in the two weeks prior to the survey. Only those caregivers of children who have recovered from their episode of illness are eligible to participate. Questions are asked about the recent episode of illness, the caregiver's actions, and the drugs the child took. In order to identify the drugs, the caregivers are asked to recall the name or show the packaging of the drug used for the sick child. To gather information about perceptions of access, general questions unrelated to the recent episodes are asked, using the commonly known names of the drugs under study.

The provider/drug outlet-level component of the tool focuses on appropriateness of treatment (i.e., drug choice for prescription or sale and referral) using hypothetical scenarios of sick children and questions about stock movement, drug availability and cost, and packaging. This questionnaire is administered to drug sellers and health care providers in the formal sector (e.g., at health facilities, in licensed pharmacies, and to community health workers) and the informal sector (e.g., at boutiques, with market vendors).

The two components of the tool generate indicators that can be used for identifying problems and eventually for measuring change after implementation of interventions. These indicators are grouped around the framework for community drug management and are shown in Annex 1.

Preparation Phase

Several stakeholders in this survey were from various departments and divisions of the Ministry of Health at the central level, including the Direction de la Pharmacie et du Médicament (DPM), the Pharmacie Nationale d'Approvisionnement, the Division de l'Alimentation et de la Nutrition, the Direction de Soins de Santé Primaire (DSSP), and BASICS II. Several planning meetings were held with the stakeholders prior to the survey itself in order to adequately brief them on the tool and the results that would be generated as well as to plan the actual implementation of the survey. The main collaborators are listed in Annex 2. The MoH at central level selected the two districts to be studied and contacted the regional and district health offices to inform them and obtain their approval and authorization for the activity. A follow-up visit was later made by a

survey coordinator to each of the regional and district offices to explain the survey in more detail and discuss logistics.

Instrument Adaptation and Preparation

Before the two questionnaires were used in Senegal, but after their initial development and revision in English, they were translated into French for review in-country and adaptation to the Senegalese context. The questionnaires were then pretested in both the supervisors' training and the data collectors' training and revised accordingly prior to their actual use in the survey for data collection.

To ensure that data collected from the drug providers/drug outlets included information on the availability of both essential and “inappropriate” drugs for treating the health conditions targeted by the survey, the researchers constructed a tracer list of drugs for use in the questionnaire. The list was based on the standard treatment guidelines and on local prescribing, dispensing, and consuming behavior. The tracer list consisted of key essential drugs, contained in the national standard treatment guidelines for IMCI as well as some of the most commonly prescribed, sold, or used drugs for malaria, pneumonia, and diarrhea in children, including some drugs considered “inappropriate” for the given conditions in children. The tracer list is shown in Annex 3. The generic drugs were listed with two or three commonly known brand names to assist the nonqualified vendors and health workers who may not recognize generic names (e.g., co-trimoxazole: Bactrim, Cotrex). The most common names were also used in the household survey to ask general questions about perceptions of drug availability of key drugs—for example, “Can you always get Bactrim in the area where you live?”

A card was developed as an aide-mémoire for tablet identification in the household survey. In order to facilitate identification of a drug if no tablets or packaging were available to show the data collector and the caregiver did not know the name, the card depicted several different shapes and sizes of commonly encountered tablets.

Human Resources

A pharmacist was recruited by RPM Plus/BASICS II and MoH as a research coordinator to oversee all phases of the survey and was assisted by an administrative assistant.

The MoH took responsibility for assigning the human resources required for supervision of the data collection and for the analysis, assigning two of the six supervisors from central level, and the Regional Medical Officers of the two districts targeted by the survey each identified two data collection supervisors and analysts. The persons selected are listed in Annex 2.

Supervisors

The Regional Supervisors (Superviseurs de soins de santé primaire [SSSP]) for Kaolack and Thiès, a Health Education Supervisor (Kaolack), and a Research and Training Supervisor (Thiès) were assigned by the two regions. There were also two central-level supervisors, one from the DAN and another from the DPM. The role of the supervisors was to prepare the survey sites by

notifying them and getting approval from the village and neighborhood leaders, to facilitate the training of the data collectors, to supervise the data collection itself, to check that the questionnaires were complete and accurate, and to oversee the data analysis.

Data Collectors

A total of 30 schoolteachers with little or no research experience were recruited (15 from Kaolack and 15 from Thiès) by passing a preselection interview process for data collector training. The aim was to retain for the data collection itself those who proved to be the most competent during the training. A total of 22 data collectors (shown in Annex 2) were retained; 11 for each district (7 household interviewers and 4 provider interviewers per district). The role of the data collectors was to complete a four-day training course at a central location and then conduct two weeks of data collection in their home districts.

Analysts

At each site (Kaolack and Thiès), two data analysts (one to work on the household data and the other to work on the provider data) were selected by the Regional Medical Officer to perform manual data compilation and tabulation, using an instruction manual. In Kaolack, the analysts were from the district health office, one was the administrator and the other was the district SSSP. In Thiès, both data analysts were from the regional bureau of statistics, owing to limited available human resources in the district and regional health offices at the time of the survey. The analysts are listed in Annex 2.

Training

The supervisors participated in a four-day preparation and pretesting of the data collection tools and sampling procedures in Dakar. The preparation consisted of an overview of the subject area and the objectives of the survey, as well as a review of interview recording techniques. The data collection instruments were carefully reviewed and revised and a preliminary translation into Wolof was drafted. After some role-play practice, two pretest exercises were conducted in an urban setting (Rufisque) and in a more rural setting (Sangalcam). Final revisions were made to the instruments and the respondent selection methodology as a result of these exercises. The process of data “cleaning” and accuracy checking was discussed, random selection of survey sites was made, and the training of data collectors and the data collection schedule were planned.

The data collector training held in Kaolack also lasted four days and included two days of field practice in an urban and rural setting (Guingueneo and Kahone, respectively). (The schedule is shown in Annex 4.) The training was facilitated by the survey coordinator, the supervisors, and RPM Plus staff. All the data collectors were trained together for the first half day and then split into two groups, one for each type of questionnaire (household and drug outlet), for the remainder of the training. The training used a variety of methods: group discussions, plenary discussions, brainstorming, role-play, and practice sessions in the field. A consensus was reached in each of the groups on a translation of the questionnaires into Wolof. This translation was not written but agreed on verbally by the data collectors; the questionnaires remained in French. After the training, the data collectors returned to their own districts to start data collection.

The data analysts were trained over two days in Thiès at the end of the first week of data collection. On the first day, they were briefed on the purpose of the study and the role of the analysts. Trainees then received the analysis manuals to review, any questions were answered, and then they were asked to follow the instructions of the manual and perform select tabulations using some questionnaires from the first few days of data collection. On the second day, analysts returned to compare their results and discuss any problems encountered.

Sample of Survey

The study was conducted in urban and rural settings in Kaolack and Thiès Districts. These districts were chosen by the MoH as priority districts for C-IMCI activities and also because they had similar geographic and demographic profiles. One district had also been surveyed in the previous DMCI survey.

The sampling methodology of survey sites in each of the districts was a cluster sampling. Twenty clusters were required for each district. Census Bureau–defined clusters (*districts de recensement*) of approximately 800 to 1,000 inhabitants, or *quartiers* of a similar size in the urban areas, were used as the cluster units, and the research team randomly selected 20 clusters in each district. The number of urban and rural clusters selected was proportional to the distribution of the populations living in each district according to the most recent available census data (1988) from the Senegal Statistics Bureau, with revisions made from local informants of some more recent reclassification (Table 1).

Table 1. Numbers of Clusters per District

District	Percentage of Population in Urban Areas	Number of Urban Clusters	Percentage of Population in Rural Areas	Number of Rural Clusters	Total Number of Sites
Kaolack	64	13	36	7	20
Thiès	64	13	36	7	20

The required number of clusters was chosen at random from the universe of census districts or *quartiers* of each district and the resulting sample frame is shown in Annex 5. Within each selected rural cluster, there were typically multiple villages and hamlets, which affected the selection of the household respondents as described below.

Household Sample and Selection

The aim of the sampling methodology was to achieve 300 interviews per district, or 15 interviews per cluster. Within urban clusters, all 15 interviews were conducted in the urban neighborhood or *quartier*. Within rural clusters, the 15 interviews were distributed among the villages and hamlets therein, in proportion to the size of the population living in the various villages and hamlets of a particular census district. For example, if 60 percent of the population

lived in villages and 40 percent in hamlets, 9 interviews were to be conducted in the villages and 6 in hamlets, for a total of 15.

In urban settings, of a team of three or four data collectors, some began their search for eligible respondents at the periphery of the neighborhood and the remaining data collectors began in a central location. In rural sites with multiple villages and hamlets, the team divided the number of interviews among these villages and hamlets according to the population distribution as previously described. All data collectors moved in different directions searching for eligible respondents at households at a prespecified interval of four to eight houses, the size of the interval dependent on the density of the population. To be eligible for participation, the respondent had to—

- Have a child under five living in the household who had been sick in the previous two weeks but who was now well
- Have been responsible for the care of that child during his or her illness

Where multiple children in a household met the first criterion, interviewers were instructed to question about the youngest.

Provider/Drug Outlet Selection

The aim of the sampling methodology was to conduct up to 10 provider/drug outlet surveys per cluster (for up to 200), where possible, and overall 20–40 surveys were aimed for per category. Five categories of outlets were included in the provider/drug outlet survey—

1. Public and private health facilities
2. Pharmacies
3. Boutiques
4. Authorized medicine distributors (e.g., community health agents)
5. Other persons (e.g., street or market vendors)

The provider survey was administered in a particular cluster site one day after the household team had visited that site. Within each site, a three-pronged approach was used to select providers/outlets. First, a list of all known providers/outlets in categories 1, 2, and 4 was generated from information at central, regional, and district MoH; lists of health facilities and private pharmacies obtained from the DPM were completed at district level using up-to-date local information. Additional providers were added to the list for a certain cluster if identified by the household survey the previous day. For example, several boutiques and market vendors were identified in this way. Then, upon arrival at the site, data collectors asked individuals in the area where they purchased or obtained drugs. If new locations or vendors were named, these were also added to the list. Health care providers and drug outlets were not added to the sample frame if they were more than 20 kilometers from the study site and mentioned by only one person. Where there were four providers/outlets in a given category, all were interviewed. If there were more than four, the four providers/outlets to be approached were selected at random. Thus, the

sample of providers depended on the number of providers existing and used by the population, and it was impossible to fix a target number to be attained.

Data Collection

Data collection took place in Kaolack and Thiès Districts over a two-week period from September 1 to 13, 2002. In each district, the data collectors formed two teams for the household survey, of four persons in the rural environment and three in the urban environment. The provider survey was conducted by two teams of two data collectors in each district, one for the rural areas and one for the urban. Each team covered a cluster a day, and each data collector conducted interviews individually. Vehicles were at the disposition of each team, and one supervisor accompanied each team for the duration of the data collection. Since the sampling of drug outlets was dependent on the information from the household survey, the household part of the survey started one day before the provider portion. In both districts, data collection occurred over 12 days during a two-week period. Many villages were difficult to find, and guides were often employed by the rural teams.

In the household survey, interviews were conducted with the primary caregiver, and where several people were involved in caregiving decisions and actions, they all contributed. In the provider survey, data collectors administered the portions of the questionnaire dealing with treatment decisions to those responsible for such decisions and the portions of the instrument addressing inventory to those with that responsibility. In some settings (e.g., pharmacies) the respondent was often the same person, and in others (e.g., health centers or posts), they could be different people, according to their roles.

Data Processing and Analysis

Prior to the analysis itself, the questionnaires were coded and checked for completeness (cleaned) by the survey supervisors. The supervisors attempted to identify the names of the drugs that respondents did not recall from their descriptions of the drugs, and finally the research coordinator did the same before passing the questionnaires to the analysts. The names of drugs were retained only when there was a degree of certainty of a positive identification. The coordinator conducted a final check of the questionnaires prior to analysis. The analysis was conducted over a three-week period from September 23 to October 11, 2002. The analysts conducted a manual tabulation using pre-prepared tables to calculate the indicators.

The analysis was also checked by using the computer analysis statistics programs SPSS and SAS in Washington, D.C., as a means of evaluating the analysis process and verifying the results.

A first draft of the results was presented at a stakeholders' workshop in February 2003, where further input to the presentation and interpretation of the results were made and implications for planning and interventions were discussed by the key partners.

INTERPRETATION OF FINDINGS

Description of the Sample

Households

The sample of caregivers in the household survey was 300 in each district. As previously described, the sample was taken from rural and urban areas in proportion to the rural/urban population split. In both Kaolack and Thiès, 195 questionnaires were completed in the 13 urban clusters and 105 in the 7 rural clusters.

The sample of children in both districts was fairly evenly split by gender (52 percent male in Thiès and 54 percent in Kaolack) and across the five-year age group, with 68 percent of children being under three years old in Kaolack and 75 percent in Thiès. The distribution of symptoms studied in the sample of children is shown in Table 2. Because a child may have more than one symptom, the percentages add up to more than 100 percent.

Table 2. Sample of Children Studied, by Symptom

Symptom	Thiès (N = 300)	Kaolack (N = 300)
Fever	90%	91%
Convulsions	2%	2%
Fast breathing	21%	23%
Diarrhea	38%	51%
Bloody diarrhea, percentage of total sample	5%	11%
Bloody diarrhea, percentage of those with diarrhea	14% (n = 110)	22% (n = 152)
Cough but no fast breathing	40%	40%

The majority of children had fever, about half had some kind of diarrhea, of which about a fifth was bloody diarrhea; just under half had symptoms of simple cough; and around a fifth had fast breathing (the symptom indicative of pneumonia). In both districts more cases of fast breathing were found in rural areas (14 percent of urban interviews and 36 percent in rural areas of Kaolack; 15 percent urban and 31 percent rural in Thiès). Very few caregivers reported their child having had convulsions (assumed to be severe malaria), even though it was malaria season. The sample was not intended to include equal numbers of each disease for making comparisons between the disease groups; so the fact that there were few cases of convulsions merely represents the fact that there was a low prevalence of severe malaria at the time of the survey in the study areas.

Providers of Drugs

The distribution of the different types of providers of drugs varied across the drug outlets included in the survey. Including both districts, 263 drug outlets were surveyed. The survey in Thiès involved 130 providers comprising 46 health facilities, 28 pharmacies, 33 community

health huts, and 23 other vendors (including street merchants, boutiques, and market vendors). In Kaolack, the survey involved 133 drug outlets, including 38 health facilities, 32 pharmacies, 30 community health huts, and 33 other vendors. In the urban clusters, five or six providers in total were interviewed per cluster (66 questionnaires in urban Kaolack and 79 in urban Thiès), and in the rural clusters between seven and nine providers were interviewed per cluster (67 questionnaires in rural Kaolack and 51 in rural Thiès).

“Health facilities” include public, private, and mission health facilities, although predominantly public facilities were surveyed in each district. It was decided to combine the results from respondents in boutiques with those from market vendors in an “other vendor” category because there were insufficient of each type when taken alone (the minimum sample desired was 20). When adhering to the cluster sites of the survey, the number of health huts and pharmacies initially surveyed was less than 20. Thus a decision was made to supplement these two groups with a few extra outlets providing drugs from different sites within the district but not otherwise included in the survey. A total of 9 health huts, 2 pharmacies, and 2 health centers were added in Thiès from sites not in the original sampling frame; in Kaolack, 6 pharmacies, 2 health huts, and 6 vendors were added from sites not in the original sampling frame.

Table 3 shows the distribution of providers as a percentage of the total sample and the proportion of each group from an urban area.

Table 3. Distribution of Provider Sample, by Facility Type and Urban Location

Type of Provider	Thiès (N = 130)		Kaolack (N = 133)	
	Percentage of Sample	Percentage of Outlets in Urban Area	Percentage of Sample	Percentage of Outlets in Urban Area
Health facilities	36	72 (n = 46)	29	37 (n = 38)
Pharmacies	21	82 (n = 28)	24	81 (n = 32)
Health huts	26	6 (n = 33)	22	10 (n = 30)
Other vendors	17	14 (n = 23)	24	47 (n = 33)
All providers		47 (n = 130)		43 (n = 133)

As shown in Table 3, the majority of private pharmacies were found in urban areas, whereas few health huts were found in urban areas. The other vendors and the health facilities were split between urban and rural areas.

The level of training of each of the respondents was determined because this factor may influence the selection or development of interventions; these results are shown in Table 4. Not surprisingly, the majority of respondents in health facilities were trained nurses. Of note, however, is the division of respondents in private pharmacies between pharmacists and trained drug sellers. The majority of health huts surveyed were staffed by volunteer workers who had received some training, but the drug vendors in the informal sector were mostly untrained in health issues.

Table 4. Level of Training of Respondents at Drug Outlets

	Pharmacist	Doctor	Nurse/ Nurse-Midwife	Medical or Lab Technician	Other Health Training	No Training
Health facilities Kaolack (n = 38)	2%	13%	66%	5%	13%	
Health facilities Thiès (n = 46)	2%	15%	68%	6%	11%	
Pharmacies Kaolack (n = 32)	44%				56%	
Pharmacies Thiès (n = 28)	64%				36%	
Health huts Kaolack (n = 30)					100%	
Health huts Thiès (n = 33)			6%		94%	
Other vendors Kaolack (n = 33)				3%		97%
Other vendors Thiès (n = 23)					4%	95%

The distance of the surveyed drug outlets from the nearest health facility (such as a health center or health post) was also studied. It can be seen from Table 5 that the majority of health huts surveyed were more than one kilometer from a health facility. However, the majority of other vendors were at a distance of under one kilometer from the nearest health facility; apparently these vendors do not serve the more rural isolated areas.

Table 5. Distance of the Providers from the Nearest Health Facility

Type of Provider	Under 1 km	1–5 km	More than 5 km
Pharmacies, Kaolack (n = 32)	100%		
Pharmacies, Thiès (n = 28)	90%	7%	4%
Health huts, Kaolack (n = 30)		33%	67%
Health huts, Thiès (n = 33)	24%	56%	20%
Other vendors, Kaolack (n = 33)	91%	9%	
Other vendors, Thiès (n = 23)	54%	32%	14%

Results

The results are presented according to the four points of the framework of appropriate community drug management—

1. The caregiver recognizes child's symptoms.
2. The caregiver seeks timely care at an appropriate source.

3. The caregiver obtains appropriate drugs.
4. The caregiver uses appropriate drugs correctly in the home, that is, according to an appropriate regimen (dose, frequency, duration).

Information from both the provider and household surveys is complementary and provides different aspects of each of the steps of the framework.

The results are presented for each of the two districts and can be compared because the districts have similar geographic and demographic profiles.

Step 1. The caregiver recognizes child's symptoms

The information for this step in the framework comes only from the household survey. Of the cases with fast breathing (assumed to be pneumonia), most were considered to be very serious by the caregivers (97 percent [of 36 cases] in Thiès and 82 percent [of 40 cases] in Kaolack), and all cases of convulsions (five in each district) were considered to be very serious.

Step 2. The caregiver seeks timely care at an appropriate source

Care Seeking for Cases of Fast Breathing

The majority of caregivers for children with fast breathing sought care outside the home (74 percent in Thiès [n = 62] and 84 percent in Kaolack [n = 56]); this action is desired because cases of pneumonia should not be treated at home. Seeking care outside the home tended slightly to happen less in rural areas than in urban areas. In Thiès 83 percent of 29 urban cases sought care outside the home compared with 66 percent of rural cases (n = 33), although this difference was less marked in Kaolack, where 87 percent of 27 urban cases sought care outside the home compared with 81 percent (n = 33) in rural areas.

Table 6. Timing of Care Seeking for Fast Breathing

Sought Outside Care for Fast Breathing	Thiès (N = 46)	Kaolack (N = 47)
Same day	30%	25%
Next day	28%	34%
2 days later	17%	17%
3 or more days later	24%	23%

As shown in Table 6, however, in many cases seeking care outside the home was delayed. In both districts, only just over half the caregivers of children with fast breathing sought care on the same day or the next day that the symptom started, and about a quarter of cases waited three or more days after the onset of symptoms. Caregivers in the rural areas tend slightly to seek care more quickly; in Kaolack, 15 percent of 20 urban cases sought care on the same day compared with 33 percent of 27 rural cases, and in Thiès 25 percent of 24 urban cases compared with 36 percent with 22 rural cases.

The first source of care that the caregivers decide to use is important in assessing appropriateness of action. An appropriate source of care if visited first may expedite recovery and minimize unnecessary spending on inappropriate treatments. In both districts, as shown in Table 7, the majority of caregivers took their child with fast breathing to a health hut, health post, health center, or private clinic, with most going to the health post; pharmacies and the informal sector (boutique or market vendor) were little frequented. Health huts were more used in Kaolack, which could be attributed to an increased functionality in that district. Private clinics were more frequented in Thiès, which could be due to an increased accessibility or availability of clinics there.

Table 7. First Source of Care Used for Children with Fast Breathing

First Source of Care Used	Thiès (N = 46)	Kaolack (N = 47)
Health center	17%	17%
Health post	37%	43%
Health hut	2%	15%
Private clinic	28%	6%
Traditional healer	9%	4%
Pharmacy	4%	2%
Boutique	0%	6%
Market	0%	2%
Other	2%	4%

Not all levels of care are intended to treat cases of fast breathing; in general, such cases should be treated at a health center. Of those who sought care for children with fast breathing at a place outside the home other than the health center, less than a third (31 percent in Thiès [n = 38], and 20 percent in Kaolack [n = 39]) reported that they were referred to a health center. Disaggregating the data into rural and urban sets, urban providers tend to refer more readily than rural providers. Maybe this tendency relates to the proximity of the health center; in Kaolack, 23 percent of 17 urban cases were referred compared to 17 percent of rural cases (n = 22), and in Thiès, 50 percent of 20 urban cases were referred compared to 10 percent of rural cases (n = 18).

Care Seeking for Cases of Convulsions

All caregivers of children suffering convulsions sought care outside the home in both districts, although the sample was small (seven cases in Thiès and five in Kaolack). In general, these cases were managed faster than those of the children with fast breathing; 100 percent in both districts sought care on the same day or the next day after onset of symptoms, 86 percent in Thiès and 80 percent in Kaolack seeking care on the same day. There was no difference between rural and urban areas in the timeliness of care seeking.

Table 8 shows a pattern of health care-seeking behavior for convulsions similar to that for cases of fast breathing. The majority of cases are taken to “appropriate sources”: health hut, health

post, health center, and private clinic. A few children were taken to the community health worker (14 percent) in Thiès, and one case was taken to the traditional healer (14 percent) in Thiès.

Table 8. First Source of Care Used for Children with Convulsions

First Source of Care Used	Thiès (N = 7)	Kaolack (N = 5)
Health center	14%	0%
Health post	57%	20%
Health hut	14%	60%
Private clinic	0%	20%
Traditional healer	0	0
Pharmacy	0	0
Boutique	0	0
Market	14%	0

Referral to the health center was lower for cases of convulsions than for the cases of fast breathing (17 percent in Thiès and none in Kaolack), although the numbers were very small ($n = 6$ in Thiès and 2 in Kaolack). Because of the small sample, no assessment was made of differences in rural and urban settings.

Fever

Cases of fever can be managed appropriately in the home, so the survey did not study whether children with fever were treated outside the home because that is less important than the actual treatment given and the timing of the treatment. Of the caregivers who treated their child with chloroquine, the treatment was, in general, timely; all cases received the drug on the same day as the onset of fever or the following day (of 153 cases in Thiès and 149 cases in Kaolack).

Step 3. The caregiver obtains appropriate drugs

Whether the caregiver obtains appropriate drugs depends on the availability and the affordability of the drugs as well as on the knowledge and practices of the health care providers and drug sellers. The actual availability of a set of tracer drugs was assessed in the drug outlets, and the perceptions of the community about drug availability were assessed in the household survey. Affordability was taken to be a measure of access; the prices of drugs were recorded in the provider survey, and the community's perceptions on drug prices were assessed in the household survey.

The sources that caregivers used to obtain their drugs are presented next, and then within each disease group, the reported knowledge and practices of providers in prescribing or selling drugs follow, because these may influence the drugs that caregivers obtain for their sick children. Providers' knowledge of treatment of childhood illnesses was assessed by describing hypothetical case scenarios of children with symptoms indicative of the IMCI diseases—ARI non-pneumonia (runny nose), pneumonia (fast breathing), malaria (fever), and diarrhea (frequent

loose stool)—and asking questions about the treatment the providers would recommend. The actual practices of respondents in drug outlets were evaluated by asking which drug they most commonly sold for certain conditions and what numbers of people they estimated bought it.

Actual Availability

The list of tracer drugs was used to evaluate the availability of specific drugs at drug outlets and is shown in Annex 3. This list included key first- and second-line drugs for malaria, pneumonia, and diarrhea, as well as some commonly misused or inappropriate drugs for these conditions in children. The data collector asked providers if they had the drugs currently in stock.

The availability of the specific drugs is shown in Table 9 and Table 10. The drugs are arranged in order of types of drugs: first-line drugs, second- and third-line drugs, and drugs classed as inappropriate for use in children. The problem with the classification of inappropriate for use in children is that the outlets visited sell drugs for adults as well as children. Thus, the actual availability of a certain drug, such as tetracycline, in certain facilities is not a problem in itself; however, the use or selling practices for pediatric cases must be considered.

Table 9. Overall Availability of Specific Drugs at All Drug Outlets

Type of Drugs	Tracer Drugs	All Facilities	
		Thiès (N = 130)	Kaolack (N = 133)
First-line drugs	Chloroquine tablets	70%	85%
	Chloroquine syrup	56%	54%
	Co-trimoxazole tablets	50%	73%
	Co-trimoxazole syrup	41%	44%
	ORS	10%	21%
Second- and third-line drugs	Amoxicillin capsules	46%	49%
	Amoxicillin syrup	40%	40%
	Quinine injection	43%	46%
	Sulfadoxine/pyrimethamine tablets	31%	41%
Inappropriate drugs for children	Actapulgit sachets	27%	26%
	Artesunate tablets	24%	21%
	Augmentin syrup	25%	21%
	Cefadroxil syrup	22%	22%
	Halfan tablets	22%	22%
	Metronidazole syrup	39%	35%
	Tetracycline capsules	38%	47%
	Ultralevure sachets	23%	21%

The survey was conducted in different types of outlets that are not all authorized to stock the same types of drugs, so it is not necessarily useful to study the compound percentage for availability of each drug. However, Table 9 does show that, overall, in the communities studied, there is reasonable availability of chloroquine tablets and co-trimoxazole tablets (at around 70–

80 percent in Kaolack and slightly lower in Thiès) but the availability of ORS across all types of outlets is poor. It can also be seen that overall availability tends to be lower for the second- and third-line drugs as well as inappropriate drugs than for first-line drugs. This result is to be expected, and is in fact desirable, because second-line drugs should be available only in certain facilities (e.g., health facilities and pharmacies) and the inappropriate drugs should be even less available.

It is more important to study the availability of certain drugs by facility type (Table 10), which shows the wide variation of drug availability between drugs and across facilities.

Table 10. Availability of Specific Drugs at Drug Outlets, by Outlet Type

Tracer Drug	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (n = 46)	Kaolack (n = 38)	Thiès (n = 28)	Kaolack (n = 32)	Thiès (n = 33)	Kaolack (n = 30)	Thiès (n = 23)	Kaolack (n = 33)
Chloroquine tablets	85%	87%	96%	100%	59%	77%	41%	79%
Chloroquine syrup	79%	76%	96%	100%	44%	30%	5%	6%
Co-trimoxazole tablets	79%	73%	86%	100%	12%	42%	23%	78%
Co-trimoxazole syrup	66%	63%	90%	94%	9%	20%	0%	0%
ORS	38%	60%	0%	0%	3%	23%	0%	0%
Amoxicillin capsules	77%	77%	100%	100%	6%	3%	0%	18%
Amoxicillin syrup	55%	65%	100%	93%	6%	3%	0%	0%
Quinine injection	85%	79%	75%	96%	15%	10%	0%	0%
Sulfadoxine/ pyrimethamine tablets	36%	26%	89%	96%	0%	0%	0%	42%
Actapulgit sachets	8%	10%	100%	96%	0%	0%	0%	0%
Artesunate tablets	0%	0%	96%	90%	0%	0%	0%	0%
Augmentin syrup	6%	6%	93%	81%	0%	0%	0%	0%
Cefadroxil syrup	6%	0%	82%	93%	0%	0%	0%	0%
Halfan tablets	0%	0%	89%	91%	0%	0%	0%	0%
Metronidazole syrup	49%	47%	96%	93%	12%	3%	0%	0%
Tetracycline capsules	68%	68%	7%	21%	12%	6%	64%	84%
Ultralevure sachets	4%	6%	89%	78%	0%	0%	0%	0%

First-line drugs

In both districts, first-line IMCI drugs in tablet form (chloroquine and co-trimoxazole) generally exhibited good availability in health facilities (over 70 percent) and pharmacies (about 90 percent). There is a problem with availability of ORS, which were stocked in no pharmacies and only in about half of the health facilities. ORS were also available in very few health huts, where ORS are intended to be stocked, and not at all in the informal sector. Chloroquine tablets were more readily available at health huts and other vendors in Kaolack than in Thiès. Chloroquine is supposed to be stocked in health huts because it is on the essential drugs list

(EDL) for that level of facility, but, according to the current policy, other vendors are not authorized to sell it. Co-trimoxazole is not intended for use in health huts and equally is not authorized for sale by other vendors. However, it was found to be available in almost a fifth of health huts in Thiès and nearly half in Kaolack. It was also found to be available through the informal sector in both districts, although more so in Kaolack, where it was stocked by the majority of informal sector drug vendors surveyed, and a few in Thiès.

In general, syrups of chloroquine and co-trimoxazole were less available than the tablet form in health facilities, and chloroquine syrup was less available than the tablets in health huts in both districts. Co-trimoxazole syrup was also less commonly found in the health huts than the tablets. Chloroquine syrup was found a little in the informal sector but co-trimoxazole syrup was not found at all in the informal sector in either district.

Second- and third-line drugs

Second-line drugs were in general available only in pharmacies and health facilities. It was noted that sulfadoxine/pyrimethamine (S/P), which is the second-line treatment for malaria in children, was stocked in only about a third of health facilities surveyed. Some health huts were found to have stocks of quinine injection or amoxicillin, even though these drugs should not be stocked at that level. Tablets of sulfadoxine/pyrimethamine were stocked by nearly half of the other informal sector vendors surveyed in Kaolack and some had amoxicillin capsules, although none were found in the informal sector in Thiès.

Inappropriate drugs

Antidiarrheals (for example Actapulgit and Ultralevure) are inappropriate drugs for treating diarrhea and they were found to be readily available in pharmacies. However, they were found in very few health facilities and not at all in the health huts or in the informal sector. Metronidazole and tetracycline were found in about half the health facilities, which is to be expected because they are on the EDL for that level and are not inappropriate for all patients and all conditions. However, they were also found in some health huts, where they are not intended to be stocked. Private pharmacies stocked all of the inappropriate drugs to varying degrees. The only inappropriate drug found in the informal sector was tetracycline capsules, which were readily available through market vendors and in boutiques.

Some of the key problems with availability can be identified by looking not at one drug alone but at several drugs in combination. For example, the availability of ORS and antidiarrheals demonstrates the problem in private pharmacies, where 96 percent had antidiarrheals in stock but no ORS—which is the treatment of choice for children with diarrhea. These combination indicators are shown in Table 11.

Table 11. Combination Indicators of Availability

Indicator	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (n = 46)	Kaolack (n = 38)	Thiès (n = 28)	Kaolack (n = 32)	Thiès (n = 33)	Kaolack (n = 30)	Thiès (n = 23)	Kaolack (n = 33)
Co-trimoxazole tablets but no syrup	15%	15%	0%	3%	3%	30%	0%	64%
Chloroquine tablets but no syrup	4%	15%	0%	3%	0%	53%	0%	72%
Amoxicillin (second-line drug for pneumonia) but no co-trimoxazole (first-line drug)	11%	0%	0%	0%	0%	0%	0%	0%
S/P (second-line for malaria) but no chloroquine (first-line)	15%	0%	0%	0%	6%	0%	0%	3%
Antidiarrheals in stock but no ORS	4%	2%	96%	96%	0%	0%	0%	0%

The results highlight the lesser availability of syrups in all outlets except pharmacies, the greater availability of drugs in the informal sector in Kaolack than in Thiès, and the absence of ORS in pharmacies that stock antidiarrheals.

Perceptions of Availability

In the household study, the perceptions of caregivers about the availability of certain key drugs, unrelated to the child's recent episode of illness, were assessed. The results are shown in Table 12.

Table 12. Perceptions of Availability of Chloroquine, Co-trimoxazole, and ORS

What Respondents Think	Thiès	Kaolack
Chloroquine is always available	67% (n = 296)	53% (n = 299)
Chloroquine is sometimes available	22%	19%
Chloroquine is never available	9%	24%
Co-trimoxazole is always available	63% (n = 291)	57% (n = 298)
Co-trimoxazole is sometimes available	29%	21%
Co-trimoxazole is never available	3%	18%
ORS are always available	36% (n = 184)	25% (n = 177)
ORS are sometimes available	27%	12%
ORS are never available	15%	41%

The commonly known brand names were used to ask the question in order to ensure that the caregivers recognized the drugs. Nevertheless, for ORS, 22 percent of respondents said they did

not know if ORS are available. This low response rate could mean caregivers did not recognize the product by name or they did not know if it was available.

As seen in Table 12, just over half of caregivers feel that they can always get chloroquine and co-trimoxazole in their area, and the majority feel they can get it always or sometimes, but only about a third of caregivers feel they can always get ORS where they live. In Kaolack, 24 and 18 percent of caregivers interviewed thought that chloroquine and co-trimoxazole, respectively, were never available. This response was higher than for the district of Thiès. When further analysis was conducted, a difference seemed to exist in perceptions of availability between the rural and urban areas, as shown in Table 13. Drugs are perceived to be more available in the urban areas than in the rural areas.

Table 13. Perceptions of Availability in Rural and Urban Areas

Respondents Think Drug Is Always Available	Thiès		Kaolack	
	Urban (N = 194)	Rural (N = 102)	Urban (N = 179)	Rural (N = 120)
Chloroquine	80%	41%	68%	32%
Co-trimoxazole	72%	46%	66%	44%
ORS	44%	17%	30%	17%

The perceptions of availability are interesting when correlated with the provider part of the survey, which showed that the actual availability of chloroquine in the community was good (70 and 85 percent in the two districts)—higher than the perception of chloroquine being always available but similar to the sum of the perceptions “always” and “sometimes.” The perceived availability of co-trimoxazole is very similar to the actual availability found in the survey, and ORS is perceived to be available more than it was found to be but is still low. The finding that nearly a quarter of caregivers did not know if ORS were available suggests that there is a low awareness of ORS in the communities studied.

Prices of Drugs

Another aspect of access is the price of drugs, which was studied in the provider survey. The prices of some key tracer drugs are shown in Table 14.

As can be seen, there is a huge range in the prices of drugs. In the two districts, the average cost of treatment of pneumonia in a two year old using co-trimoxazole syrup varies from 120 CFA francs (XOF) to XOF 2445 (approximately USD 0.18–3.7),¹ the lower prices tending to be in health facilities and the higher in pharmacies. The range of prices in the health facility group for all drugs is broad, largely because the group includes private as well as public clinics, although the majority were public facilities. The prices in health huts are consistently higher than those in health facilities. The prices in the informal sector are in a similar range to those in health huts and less expensive than those of the formal private sector. Treatment with tablets is always

¹ USD 1 = XOF 660 as of September 2002.

cheaper than treatment with syrups at all providers. Prices were also found to differ between the two districts.

Table 14. Prices of Tracer Drugs in Drug Outlets Studied

Drugs	Average Cost (and Range) in XOF for a Treatment of Specific Drugs for a Two-Year-Old Child			
	Health Facilities	Pharmacies	Health Huts	Other Vendors
Co-trimoxazole syrup	693	1,296	954	
Kaolack	(375–937)	(795–2,437)	(622–1,500)	
Thiès	486 (120–2437)	1,378 (1005–2,445)	765 (622–998)	
Amoxicillin syrup	683	1,222	750	
Kaolack	(360–997)	(520–2,580)	(750–750)	
Thiès	368 (90–1,252)	1,168 (510–1,774)	718 (622–878)	
Co-trimoxazole tablets	132	1,055	197	185
Kaolack	(100–300)	(141–2,270)	(196–250)	(100–250)
Thiès	167 (130–800)	1,169 (1,017–2,190)	155 (150–250)	220 (200–250)
Amoxicillin tablets	541	1,173	1,200	280
Kaolack	(200–900)	(1,113–2,535)	(1,200–1,200)	(150–375)
Thiès	528 (225–1,650)	1,256 (952–2,548)	700 (600–750)	
ORS	100		107	
Kaolack	(50–300)		(30–150)	
Thiès	35 (50–200)		100 (100–100)	
Chloroquine syrup	278	280	347	311
Kaolack	(123–622)	(262–656)	(311–435)	(311–311)
Thiès	203 (187–626)	432 (315–1057)	230 (187–281)	281 (281–281)
Chloroquine tablets	30	53	27	31
Kaolack	(19–45)	(30–64)	(19–45)	(7–75)
Thiès	21 (15–150)	68 (56–260)	27 (18–45)	40 (30–60)
S/P tablets	272	224		134
Kaolack	(200–300)	(176–429)		(176–166)
Thiès	47 (8–267)	292 (53–430)		

These prices are studied in isolation and are not, for the sake of this analysis, compared to an indicator such as minimum wage, which would give additional guidance on the affordability of the drugs.

Perceptions of Affordability of Drugs

The perceptions of the caregivers about the affordability of the key drugs were assessed, using general questions unrelated to the sick child's recent episode of illness. As for the perceptions of availability, the drugs were described using both the generic name and the common brand names.

As seen in Table 15, the majority of caregivers in both districts felt that both chloroquine and co-trimoxazole were affordable, but only around half felt that ORS were affordable; the other half did not know (again this answer could mean that they did not know if ORS were affordable or they did not know the product). Despite the wide range in prices encountered in the survey, the communities still feel that the drugs concerned are affordable, and little difference was noted between rural and urban areas in the perceptions of affordability about the three drugs.

Table 15. Perceptions of Affordability of Chloroquine, Co-trimoxazole, and ORS

What Caregivers Think	Thiès	Kaolack
Chloroquine is affordable	91% (n = 297)	82% (n = 299)
Co-trimoxazole is affordable	89% (n = 291)	81% (n = 297)
ORS is affordable	56% (n = 184)	48% (n = 177)

Quality

One other aspect of drug access is quality and, although the actual quality of drugs stocked in drug outlets was not tested, the sources of supply to a certain extent may be used as a proxy measure of quality. Reliable sources of drugs are considered to be recognized wholesalers and the public drug supply system (the central store [PNA], the regional stores [Pharmacies Régionales d'Approvisionnement; PRA], and district stores). Drugs obtained from the market and other boutiques can be assumed to be of questionable quality.

Table 16 shows the source of supply of drugs used by the respondents at the drug outlets surveyed. In both districts, health facilities tended to obtain their drugs from either the nearby government district store or the regional or central store, whereas the pharmacies bought their supply from a private wholesaler. The health huts in both districts obtained their drugs from either the health post or the district store; a few in Thiès obtained drugs from an NGO or purchased from private pharmacies or the market. If NGOs are to supply health huts, it is important that they respect drugs for that level of outlet as specified in the national EDL. Drug vendors and boutiques obtain their supplies from private pharmacies or other market sellers or boutiques. This last source of supply may have implications for the quality of drugs—for example, in terms of storage conditions (e.g., in the sun) or unmonitored expiry dates.

Table 16. Drug Outlet Sources of Drug Supply

Source of Drug Supply	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
PNA or PRA	17%	26%	—	—	3%	—	—	—
District store	60%	60%	—	—	38%	73%	—	9%
Health facility	4%	13%	—	—	12%	27%	4%	3%
Private wholesaler	—	5%	100%	94%	—	—	—	6%
Private pharmacy	4%	2%	—	6%	9%	—	13%	15%
Boutique or market	2%	—	—	—	3%	—	77%	39%
NGO	2%	—	—	—	32%	—	—	—
Other	—	—	—	—	—	—	—	36%

Note: — = Not reported as a source of supply.

The providers were also questioned to ascertain in which town or locality they purchased the drugs. A small number of providers of drugs cited Touba (an illicit parallel market) (4 percent of other vendors and 3 percent of health huts in Thiès, and 21 percent of other vendors in Kaolack) or imports from The Gambia (9 percent of other vendors in Kaolack) as a source of their drugs, especially in Kaolack. This finding may indicate dubious quality of drugs in the informal sector, where respondents reported they procured from those locations.

Sources of Drugs Used by Caregivers for Treatment

The household survey investigated where the caregivers obtained their drugs. Of those caregivers who administered certain drugs, some already had them at home, as shown in Table 17.

Table 17. Percentage of Caregivers Using Drugs Found at Home

Drug	Thiès	Kaolack
Chloroquine	36% (n = 157)	54% (n = 159)
Co-trimoxazole	7% (n = 68)	14% (n = 58)
Amoxicillin	0 (n = 9)	40% (n = 5)
ORS	25% (n = 28)	23% (n = 22)

About half of the caregivers who gave chloroquine had it available at home in both districts; overall, many fewer of those using antibiotics (co-trimoxazole or amoxicillin) reported having had them at home. Of those caregivers who had administered ORS to their child, about a quarter had it available to give in the home. Although drugs stocked at home are available readily when needed, the storage conditions are not guaranteed to be optimal, and the drugs are often the

remainder of a previous family member's treatment, implying an incomplete treatment was given. In Senegal, home storage of drugs such as antimalarials and antibiotics is not recommended by the IMCI strategy.

The sources of the first- and second-line drugs according to the national IMCI guidelines (chloroquine, co-trimoxazole, sulfadoxine/pyrimethamine, amoxicillin, ORS, and nalidixic acid) obtained by the caregivers were studied, including the original sources of those drugs available at home. In general, caregivers acquired these drugs from a variety of different types of drug providers, but predominantly from health facilities, private clinics, and pharmacies. This finding was also observed in the secondary analysis of the ESIS data (BASICS 2002).

The majority of the drugs shown in Table 18 were obtained from government health facilities, private clinics, or private pharmacies. Community health workers, boutiques, and market drug vendors were not an important source of drugs of the caregivers interviewed, representing less than 10 percent of each of these drugs used in either district. Traditional healers were not noted to be providers of modern medicines in either district. This trend may contradict the common belief that caregivers seek care in the community from the informal sector before going to a health facility or formal sector provider. It may be a specific trend for actions of caregivers for the treatment of sick children; sources of drugs for adults may be different, as is suggested by the results of the Environmental Developmental Action in the Third World (ENDA) report (1995), which mentions a similar profile for sources of drugs for treating children but that adults frequent traditional healers for plants for certain conditions as well as the informal markets for modern drugs in order to economize.

Table 18. Sources of Specific Drugs Used by Caregivers

Drug Source	Chloroquine		Co-trimoxazole		Amoxicillin		ORS	
	Thiès (N = 157)	Kaolack (N = 159)	Thiès (N = 68)	Kaolack (N = 58)	Thiès (N = 9)	Kaolack (N = 5)	Thiès (N = 28)	Kaolack (N = 23)
Traditional healer	0%	0%	0%	0%	0%	0%	0%	0%
Health facility	41%	33%	44%	34%	44%	20%	61%	56%
Private clinic	18%	9%	13%	4%	22%	20%	0%	22%
Pharmacy	34%	48%	34%	38%	33%	60%	32%	22%
Boutique	1%	3%	2%	14%	0%	0%	4%	0%
Market	1%	1%	2%	2%	0%	0%	0%	0%
Health hut	3%	1%	4%	2%	5%	0%	4%	0%
Other	2%	4%	0%	7%	0%	0%	0%	0%

Sulfadoxine/pyrimethamine and nalidixic acid were not mentioned by a single caregiver in the survey.

The sources were studied of all drugs reported in the survey as used by the caregivers and an acquisition pattern similar to that for the selected IMCI drugs was noted. "All" drugs include cough and cold remedies, vitamins, and all the other drugs recorded in the survey. It can be seen in Table 19 that the most frequently used sources of drugs are the private pharmacy and public

sector health facility. The informal sector market and boutiques are used very little by caregivers to obtain drugs for their sick children. This is important information in determining and targeting interventions to improve community drug management.

Table 19. Sources of All Drugs Used by Caregivers

Source	All Drugs of Survey	
	Thiès (N = 687)*	Kaolack (N = 603)
Traditional healer	0%	0%
Health facility	37%	30%
Private clinic	15%	8%
Pharmacy	38%	45%
Boutique	4%	10%
Market	1%	2%
Health hut	3%	1%
Other	2%	4%

* N = the number of drugs reported by the caregivers in the survey.

Provider Recommendations and Practices for IMCI Illnesses

The knowledge and practices of health care providers and drug vendors may influence the choice of drug obtained by the caregiver.

ARI No Pneumonia

The selling or prescribing practices of providers were assessed by describing a hypothetical case of a child with symptoms of ARI no n-pneumonia and asking the providers which drugs they would recommend for such a case and in what dose. The results are shown in Table 20.

Table 20. Reported Treatment Practices by Providers for Cases of ARI Non-Pneumonia

Reported Practice	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
Recommend an antibiotic	44%	71%	39%	47%	3%	23%	0	25%
Recommend the national standard treatment	53%	37%	18%	22%	3%	17%	0	3%
Recommend nothing	15%	0	0	0	3%	6%	43%	30%
Refer the case	2%	3%	11%	6%	39%	33%	43%	36%

A moderate overuse of antibiotics to treat hypothetical cases with symptoms of ARI no n-pneumonia was reported in both Thiès and Kaolack by all providers, but the overuse was

reported more in the health facilities (especially in Kaolack) and pharmacies. The national standard treatment recommended by the Senegal IMCI strategy is honey and, if necessary, paracetamol, which was reported as being recommended by less than half the providers surveyed, although a few providers said they would recommend nothing. Nearly half of the providers in health huts and the other vendors (sellers in markets and boutiques) said they would refer such a case to another provider, which is not necessary for a case of simple non-pneumonia.

ARI Pneumonia

In response to a hypothetical case of a child with symptoms of pneumonia (fast breathing), the reported recommendation, or sale of any antibiotic by those respondents at drug outlets who would recommend a drug treatment, was only moderate, even at health facility level, because all cases of pneumonia should get antibiotics (Table 21).

Table 21. Reported Treatment Practices by Providers for Cases of ARI Pneumonia

Reported Practice	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
Number of respondents who would recommend treatment	25	23	1	6	2	7	0	3
Percentage who would recommend an antibiotic	72%	65%	0%	33%	50%	0	0	0
Percentage who would recommend co-trimoxazole (the first-line treatment)	44%	17%	0%	0%	50%	0	0	0
Percentage who would recommend amoxicillin (second-line treatment)	24%	26%	0	33%	0	0	0	0
Percentage who would recommend an injection	0	2%	0%	0%	0%	0	0	0
Percentage of respondents who would refer the case	37%	34%	89%	75%	88%	73%	48%	67%

The reported recommendation of using the recommended antibiotic (co-trimoxazole) for children with pneumonia was low, even at the health facilities, where less than half the respondents would prescribe co-trimoxazole. Co-trimoxazole was not mentioned in private pharmacies. The use of injections is not necessary as first-line treatment for cases of pneumonia except in certain circumstances, and it is good that few providers mention selling or prescribing an injection. The other drugs mentioned were chloroquine, cough remedies, paracetamol, and salbutamol. Many

providers of drugs said that they would refer the case to another facility. Around a third of the respondents in health facilities (e.g., health centers and health posts) replied thus; however, at that level providers should be able to manage a case of pneumonia adequately and only need referral for complications. It is appropriate for health workers at health huts to refer a case of pneumonia and more than 70 percent reported they would, because they are not trained to diagnose and treat such a case and also should not stock the required antibiotics. Respondents in pharmacies did not in general recognize fast breathing (the key symptom described in the hypothetical case) as indicative of pneumonia, accounting for the very low use of any antibiotics and the high case of reported referral.

Despite the poor results with the scenario of a hypothetical case of pneumonia, which is a proxy indicator for knowledge, when asked what was the most commonly sold or dispensed drug for pneumonia, an antibiotic (co-trimoxazole and amoxicillin) was reported in health facilities in Kaolack and Thiès as well as in health huts in Kaolack; more amoxicillin was dispensed than co-trimoxazole in Kaolack. In both districts, respondents in pharmacies and other informal sector vendors reported cough remedies such as Theralene, Pneumorel, and Pectol as their most commonly sold drugs for pneumonia. This finding demonstrates that the problem of antibiotics not being reported in the hypothetical case was not due only to nonrecognition of the symptoms, because the question regarding commonly sold drugs used the term “pneumonia” and was not dependent on symptom recognition. Evidently, the gravity of pneumonia is underestimated or the term “pneumonia” is misunderstood in pharmacies and by vendors in the informal sector, as both do in fact sell drugs—inappropriate ones—for such cases, despite reporting in the hypothetical case section that they would refer.

Fever (Malaria)

As shown in Table 22, when the hypothetical case of a child with fever was described to the providers, most respondents reported that they would sell an antimalarial. The majority of providers in the health facilities and health huts who would give drugs reported that they would recommend chloroquine. Also in the pharmacies in Thiès the majority would recommend chloroquine, but in Kaolack only 56 percent of interviewees in private pharmacies who would give drugs said they would recommend chloroquine for malaria. Is this result caused by lack of information about the national first-line treatment or other incentives to sell drugs other than chloroquine? Few informal vendors sell antimalarials, although more do in Kaolack than in Thiès, but of those that do, most sell chloroquine. It is encouraging to note that very few providers reported they would use injections and antibiotics to treat malaria.

Table 22. Reported Treatment Practices by Providers for Cases of Malaria

Reported Practice	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
Number who would recommend treatment	45	35	25	30	23	26	4	27
Percentage who would recommend any antimalarial	100%	100%	88%	90%	91%	84%	25%	66%
Percentage who would recommend chloroquine	84%	88%	76%	56%	91%	91%	25%	63%
Percentage who would recommend an antibiotic	6%	6%	10%	0	0	0	0	0
Percentage who would recommend an injection	6%	3%	2%	0	0	0	0	0
Refer the case	0	5%	4%	3%	27%	10%	43%	9%

The proportion of respondents who report recommending chloroquine tends to decrease across the facilities, with the highest proportion being in health facilities and the lowest among other vendors. Those who did not report selling chloroquine mentioned antipyretics, quinine, amodiaquine, ampicillin, and amoxicillin or said they would refer.

When the providers were asked what was the most commonly sold or dispensed drug for malaria, in both districts, chloroquine was generally the response. Although in Thiès, drug vendors cited aspirin as their most commonly sold drug for malaria. Sulfadoxine/pyrimethamine (the second-line drug for malaria) was not mentioned by any provider as being the most commonly sold.

Diarrhea

In the provider survey, only watery nonbloody diarrhea was studied and not bloody diarrhea. As shown in Table 23, antibiotics were reportedly recommended frequently for hypothetical cases of diarrhea by all the respondents. This response was noted to be particularly high with the market vendors and boutiques (other vendors) in Kaolack. In both districts, there was a moderate overuse of antibiotics in both health facilities and private pharmacies. This result was lower in health huts, but antibiotics should not be stocked in health huts, so in theory should not be used there at all.

Table 23. Reported Treatment Practices by Providers for Cases of Diarrhea

Reported Practice	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
Recommend an antibiotic	21%	26%	22%	31%	3%	10%	18%	63%
Recommend an antidiarrheal drug	15%	13%	59%	65%	6%	0	0	0
Recommend ORS	85%	89%	42%	37%	82%	83%	4%	6%
Recommend only ORS	47%	57%	7%	9%	76%	63%	4%	3%
Refer the case	6%	3%	18%	0	12%	7%	35%	21%

A high level of inappropriate recommendations of antidiarrheal drugs was reported at the pharmacies in both districts. Antidiarrheals were rarely reported by the respondents from the other outlets. ORS were reportedly recommended for the hypothetical case by the majority of respondents in health facilities and health huts in both districts (over 80 percent), despite the fact that there were problems with its availability, demonstrating that the providers were aware that ORS should be the treatment of choice. Fewer pharmacies reported that they would sell ORS; this finding is not surprising considering the drug availability results, which showed that no pharmacies had ORS in stock. Hardly any vendors reported that they would recommend ORS, although about a fifth said they would refer the case. Some pharmacies and health huts said they would refer also, which should not be necessary at that level for a case of mild diarrhea.

Despite these results for the hypothetical scenarios, which reflect to some extent the knowledge of providers, asking what were their most commonly sold drugs for diarrhea gives a better idea of actual practice. ORS was reportedly the most commonly dispensed drug for diarrhea in health facilities and health huts in both districts. Tetracycline was the most commonly sold drug by other vendors in both districts and in pharmacies in Kaolack, with metronidazole and Ricridene (another antidiarrheal) in Thiès.

These results show that there are many influences on the drugs obtained for a sick child: the availability and affordability of drugs; the provider's knowledge; the provider's actual practice, which often differs from that knowledge; and finally the caregiver's own decision making and behavior, which may be influenced by a variety of factors—not just the recommendation or information given by the provider of drugs.

Step 4. The caregiver uses appropriate drugs correctly in the home

The first aspect to be studied is whether appropriate drugs were used; each of the conditions is presented in turn with the drugs actually used to treat the children, followed by results of the administration of drugs in the home. The way drugs are administered in the home by caregivers may be influenced by information given to them where they acquired the drug or by their own previous experience.

Appropriate Drug Use

ARI Non-Pneumonia

ARI non-pneumonia represents more common self-limiting infections like the common cold or simple cough, which are caused by viruses and thus should not be treated with antibiotics. Use of antibiotics for ARI non-pneumonia is a widely practiced inappropriate use and is costly to the health system as well as to the consumer; reduces availability of antibiotics for other, more serious health problems; and contributes to development of antibiotic resistance.

At the household level, of the caregivers whose child had simple cough and no fast breathing (assumed to be ARI non-pneumonia), nearly a quarter in both districts (22 percent) reported having given their child an antibiotic.

Pneumonia

In developing countries, bacteria cause most cases of pneumonia. These cases need treatment with antibiotics: specifically, the first- or second-line antibiotic as stipulated by IMCI guidelines, which is co-trimoxazole first-line and amoxicillin second-line in Senegal.

Studying the children who had fast breathing (taken as the symptom indicative of pneumonia) around a fifth of their caregivers (14 percent in Thiès and 23 percent in Kaolack) actually used co-trimoxazole (the first-line antibiotic for pneumonia) for treating their children. More caregivers in the rural areas of Kaolack gave co-trimoxazole to their child with fast breathing (28 percent [n = 43]) than in the urban areas (19 percent [n = 26]). This pattern was reversed in Thiès, where more caregivers in the urban areas administered co-trimoxazole (21 percent [n = 29]) than in the rural areas (9 percent [n = 33]).

Of the children with fast breathing who did not receive co-trimoxazole, only 26 percent in Kaolack and 24 percent in Thiès received another antibiotic.

Fever

In Senegal every case of fever should be treated as if it is a case of malaria and receive the first-line antimalarial, which is chloroquine (at the time of writing this report).

As shown in Table 24, only about half of the caregivers reported giving chloroquine to their children who had fever; similarly low levels of chloroquine usage were found in the KPC study by PLAN (2002) and the MICS-II (2000). However, it was noted in further analysis that more urban caregivers used chloroquine for a child with fever than did rural caregivers, in both districts.

Table 24. Percentage of Caregivers Using Chloroquine for Cases of Fever

	Thiès	Kaolack
Overall	57% (n = 270)	56% (n = 271)
Urban	64% (n = 177)	72% (n = 160)
Rural	42% (n = 93)	35% (n = 111)

Of those who did not use chloroquine, less than 10 percent used another antimalarial (4 percent in Kaolack and 9 percent in Thiès); about 30 percent used an antibiotic (32 percent in Kaolack and 30 percent in Thiès); and about 60 percent gave other drugs, including aspirin, paracetamol, and cough or cold remedies. None used sulfadoxine/pyrimethamine.

More than half the cases of convulsions (taken to be severe malaria) received treatment with chloroquine (57 percent in Thiès [n = 7]), 80 percent in Kaolack [n = 5]) and about one-fifth received treatment with quinine injection (2 children, 1 in each district, of the 12 children in both districts with convulsions). Quinine is in fact the treatment recommended by the national IMCI guidelines for children with convulsions.

Diarrhea

Nonbloody diarrhea should be treated with ORS alone, or at least fluid replacement to prevent dehydration; antibiotics and antidiarrheals are not recommended for uncomplicated diarrhea.

At household level, the management of cases of children diarrhea was not good, as seen in Table 25. About a fifth of caregivers of children with diarrhea used ORS, although even this level may be an overestimate because some of the “sachets” described by the caregivers were taken to have been ORS by interviewers (who did not see them), but in fact may have been an antidiarrheal such as Actapulgit or Ultralevure sachets. Only around two-thirds of children were given more fluids than usual. Little difference was noted between the rural and urban areas. Similar or lower levels of ORS and fluid usage were found in the KPC study by PLAN (2002) and the MICS-II (2002). On the one hand, few caregivers gave antidiarrheals, but on the other hand, of the cases of nonbloody diarrhea, about a fifth of caregivers unnecessarily used an antibiotic.

Table 25. Treatments Used for Children with Diarrhea

Treatment Reported by Caregivers	Thiès	Kaolack
Gave ORS to their child with diarrhea	25% (n = 112)	15% (n = 152)
Gave their child with diarrhea more fluid than usual	68% (n = 112)	61% (n = 151)
Gave an antidiarrheal to their child with diarrhea	16% (n = 113)	3% (n = 152)
Gave an antibiotic to their child with mild diarrhea (nonbloody)	29% (n = 93)	22% (n = 117)
Used co-trimoxazole for their child with bloody diarrhea	19% (n = 16)	12% (n = 33)

Bloody diarrhea should be treated with the first-line antibiotic (co-trimoxazole) and ORS; less than a fifth of children with bloody diarrhea were treated with co-trimoxazole.

No Drug Treatment

Considering all children in the survey, 10 percent of caregivers in Kaolack and 13 percent in Thiès gave their children no drugs. Of the children with fast breathing, 12 percent in Kaolack and 8 percent in Thiès were given no drugs. Of those with fever, 9 percent in Kaolack and 4 percent in Thiès received no drugs. These two conditions require prompt treatment with drugs. No probing was carried out to find out why the caregivers administered no drugs.

Administration of the Drugs by the Caregiver

The results from the household survey demonstrate that caregivers often do not administer drugs according to the correct regimen. The administration of chloroquine, co-trimoxazole, and amoxicillin, the first- and second-line treatments for malaria, pneumonia, and bloody diarrhea, is shown in Table 26.²

As can be seen from the table, overall less than 10 percent of caregivers administering chloroquine gave it correctly (once a day for three days). Chloroquine was administered for the full three-day course in only just over half of cases. This finding is validated by secondary analysis of the ESIS data (BASICS 2002). The problems associated with giving chloroquine too short a time are that the malaria might not be cured and the risk of developing resistance is increased. Chloroquine given for too long a time is a waste of resources and may also be associated with development of resistance. The majority (about 70 percent) of caregivers gave chloroquine twice a day, compared to 19 percent who gave it once a day as recommended; this finding may pose problems with overdosing, especially if the tablets contain more active

² No child was given sulfadoxine/pyrimethamine or nalidixic acid, the second-line treatments for malaria and bloody diarrhea respectively.

ingredient than they should, as was found in a recent study (Smine et al. 2002), and also can increase the chance of developing resistance to chloroquine.

Table 26. Administration of Chloroquine, Co-trimoxazole, and Amoxicillin by Caregivers

What Caregivers Administered	Thiès	Kaolack
	(n = 156)	(n = 160)
Chloroquine correctly once a day for 3 days	7%	8%
Chloroquine:		
correct duration (3 days)	53%	63%
less than 3 days	8%	11%
more than 3 days	26%	14%
Chloroquine:		
correct frequency (once a day)	19%	19%
incorrect frequency (twice a day)	68%	72%
	(n = 68)	(n = 59)
Co-trimoxazole correctly twice a day for 5 days	25%	10%
Co-trimoxazole:		
correct duration (5–7 days)	43%	27%
less than 5 days	32%	39%
more than 7 days	9%	12%
	(n = 23)	(n = 11)
Amoxicillin correctly three times a day for 5 days	4%	0
Amoxicillin:		
correct duration (5–7 days)	56%	45%
less than 5 days	13%	9%
more than 7 days	9%	9%

Studying the other drugs (antibiotics), less than a quarter of cases were given co-trimoxazole according to IMCI guidelines (twice a day for five days) and very few, if any, were given amoxicillin according to the IMCI guidelines (three times per day for five days), although the sample of those using amoxicillin was small. Less than half of the cases treated with co-trimoxazole were given the drug for between five and seven days, and about a third were given the drug for less than five days, which, as for chloroquine, may provoke development of resistance as well as fail to treat the pneumonia. About half of the caregivers gave amoxicillin for between five and seven days.

These data show that at household level drugs are not given to children in the most appropriate way, which may affect both the outcome of the illness episode and the development of antimicrobial resistance.

Instructions on Drug Administration Given by Provider

Whether a caregiver administers drugs correctly may depend somewhat on whether caregivers were given instructions, the quality of those instructions, and whether the package is labeled with dosing information.

As shown in Table 27, the majority of those caregivers using chloroquine, co-trimoxazole, and amoxicillin reported having been given instructions on the duration of the course of treatment when they obtained the drugs from government health facilities, private clinics, and pharmacies (around 80 percent). A similar proportion of community health workers at health huts also tended to give information about duration of treatment; although because the health hut was not an important source of drugs for the caregivers surveyed, the sample size was small. When drugs were obtained from boutiques or vendors, information on the duration of treatment was reportedly given rarely. Duration of the treatment was taken as one aspect of information or instructions that should be given to caregivers in order to guide their administration of the drugs. That only this one aspect was measured as an indicator does not mean frequency and dosage are less important.

Table 27. Percentage of Caregivers Who Reported Receiving Information on Duration of Treatment from Providers

Type of Facility Where Drugs Obtained	Chloroquine		Co-trimoxazole		Amoxicillin	
	Thiès	Kaolack	Thiès	Kaolack	Thiès	Kaolack
Public health facility	94% (n = 64)	96% (n = 52)	100% (n = 30)	80% (n = 20)	100% (n = 4)	100% (n = 1)
Private clinic	86% (n = 29)	73% (n = 15)	100% (n = 9)	100% (n = 2)	100% (n = 2)	100% (n = 1)
Private pharmacy	88% (n = 55)	87% (n = 77)	87% (n = 23)	77% (n = 22)	100% (n = 2)	100% (n = 1)
Health hut	80% (n = 5)	100% (n = 1)	100% (n = 3)	100% (n = 1)	n = 0	n = 0
Boutique	0 (n = 1)	20% (n = 5)	0 (n = 1)	0 (n = 8)	n = 0	n = 0
Market	0 (n = 2)	50% (n = 2)	0 (n = 1)	0 (n = 1)	n = 0	n = 0
Other	33% (n = 3)	83% (n = 6)	100% (n = 1)	50% (n = 4)		

Providers' Knowledge of Dosing

If the providers are giving information on dosing, it is important that the information they give be correct. As some measure of providers' knowledge, they were asked to provide the doses of the drugs that they had recommended at the end of the hypothetical case that was posed to the respondents for the key diseases. The information for chloroquine and co-trimoxazole (as the drugs of first-line treatment) was generated into indicators, which are shown in Table 28.

The table illustrates a problem of provider knowledge of dosing. Of those mentioning co-trimoxazole, the correct dosage frequency (twice a day) and duration (five days) were more often reported in the health facilities of Thiès than Kaolack. Co-trimoxazole should not be available in the health huts, and when the dose was mentioned by staff at that level, their knowledge was incorrect on most occasions.

Table 28. Dosing of Chloroquine and Co-Trimoxazole by Provider Mentioning Those Drugs in the Hypothetical Case

Of Those Mentioning the Specific Drug	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
% mentioning correct frequency of co-trimoxazole	90% (n = 11)*	75% (n = 4)	0% (n = 0)	0% (n = 0)	0% (n = 1)	0% (n = 1)	0% (n = 0)	0% (n = 0)
% mentioning correct duration of co-trimoxazole	81% (n = 11)	50% (n = 4)	0% (n = 0)	0% (n = 0)	100% (n = 1)	0% (n = 1)	0% (n = 0)	0% (n = 0)
% mentioning correct frequency of chloroquine	26% (n = 38)	14% (n = 35)	10% (n = 19)	0% (n = 17)	42% (n = 21)	28% (n = 21)	0% (n = 1)	12% (n = 17)
% mentioning correct duration of chloroquine	64% (n = 38)	82% (n = 35)	88% (n = 19)	71% (n = 17)	75% (n = 21)	90% (n = 21)	0% (n = 1)	50% (n = 17)

*Because not all respondents mentioned these specific drugs, the “n” used for the percentages is the actual number of providers mentioning the specific drug and not the number of respondents surveyed. For example, of 46 health facilities in Thiès, only 11 mentioned co-trimoxazole.

All types of providers seem to have a problem with chloroquine dosing information. The rate of reporting the correct dose frequency is very low across all providers, the highest being only 42 percent in the health huts of Thiès. In general, duration was better reported, but even in health facilities only 64 percent in Thiès and 82 percent in Kaolack reported the correct duration of chloroquine treatment (three days). As expected, the informal vendors of Kaolack did not know the correct dosing of chloroquine and in a few cases they had given information to the caregiver purchasing the drug.

Overall it can be seen that although theoretically it is desirable that the providers give information on the administration of drugs to the caregivers, often that information is incorrect or inappropriate.

Dispensing Practices of Providers

The providers were asked in the survey how they dispensed their drugs and what, if anything, they wrote on the label of the packages, because the latter may influence the administration of the drug by the caregiver. Although, this style of questioning will produce results measuring the providers’ *knowledge* of good dispensing practices rather than the *actual* dispensing (which was not observed), the results can still identify problem areas. The results are shown in Table 29.

Table 29. Dispensing Practices of Providers

Dispensing Practice Reported by Provider	Health Facilities		Pharmacies		Health Huts		Other Vendors	
	Thiès (N = 46)	Kaolack (N = 38)	Thiès (N = 28)	Kaolack (N = 32)	Thiès (N = 33)	Kaolack (N = 30)	Thiès (N = 23)	Kaolack (N = 33)
Use appropriate packaging for dispensing tablets	80%	86%	96%	97%	52%	64%	61%	43%
Label tablets with dose, frequency, and duration of treatment	17% (n = 41)	53%	29%	28%	28% (n = 28)	43%	4%	9%
Use appropriate packaging for dispensing syrups	97%	100%	100%	100%	55%	100%	100%	100%
Label syrups with dose, frequency, and duration of treatment	20% (n = 40)	55%	29% (n = 28)	28%	7% (n = 28)	42% (n = 26)	50% (n = 2)	15% (n = 13)

Tablets should be contained in appropriate material to protect them from dirt and moisture in the home. Most providers of drugs appear to use appropriate packaging for tablets (defined as sealed and waterproof), primarily because the providers use the original packaging. However, the percentage is low at around 50 percent in health huts and with drug vendors, where loose tablets are more often dispensed. Syrups, in general, are sold in their original bottles, reducing the problem of packaging. Using the criteria of the label containing patient name, drug name, dose, frequency, and duration (not shown in the table because the result was zero for all providers in both districts), labeling of all drugs was considered inadequate by all providers. Using less rigorous criteria—drug dose, frequency, and duration—the table shows that more providers could be considered to label appropriately; however, even so, fewer than 50 percent of all providers were labeling with instructions necessary to facilitate the correct administration of the drug.

LIMITATIONS OF THE DATA

Methodology

As this survey was being conducted for the first time as a “field test/application,” several minor defects with the questionnaires and the methodology were noted and will be revised in the finalization of the tool. The use of hypothetical cases in the provider survey will be replaced by direct knowledge questions, because in several cases the scenarios were confusing for the respondent and thus the responses may not necessarily reflect actual knowledge. Also, if respondents did not mention a specific drug, such as chloroquine or co-trimoxazole, no assessment was made of their knowledge on dosing.

The exclusion of children who are still sick ensures to some extent that more chronic or severe cases are not assessed. This is an advantage for the interpretation of data but could mean that certain behaviors are not observed.

In the household survey not all the drugs mentioned by the caregivers were identifiable; however, the proportion is minimal and does not affect the interpretation of the results. In Thiès, 53 of 300 interviews (18 percent) and in Kaolack 28 of 300 (9 percent), or 81 of 600 (13 percent overall), contained drugs not identified by the respondents or the supervisors. The coordinator attempted to identify more of the drugs and was able to complete the identification for a further 40 of those 81 questionnaires, leaving 41 questionnaires of 600 (7 percent) containing one or more unidentified drugs.

The survey does not investigate whether drugs were obtained on prescription or on advice from other people, such as the drug vendor or friends or relatives. This information could be important in order to shape interventions.

Most of these issues have been taken into account in the final revisions of the tool and the data collection instruments.

Timing of the Survey

The survey was conducted in the rainy season, which may have affected the type of household respondents found at home; however, the full quota of interviews was conducted. During farming time it is hard to find people at home, and the data collectors did not make appointments to meet the caregivers at a later date. Did those who were found at home differ from those who were in the field and not available? The rainy season also accounts for why there were so many malaria cases.

During the months prior to the survey there had been a control by the DPM on informal drug vendors, which may have reduced the number of drug vendors encountered and produced hesitancy by the caregivers to honestly recount if they had purchased drugs from an informal source, although this effect was reduced to a minimum by using non-health-sector staff (school

teachers) as data collectors. However, the arrest of a market drug vendor in Thiès at the end of the first week of data collection may have influenced responses at household level and certainly influenced the data collectors' ability to approach informal-sector vendors.

The period during which the survey was conducted was an extremely hectic one in the regional and district health offices, which meant that there were conflicting demands on staff and other resources. Nevertheless, the participation and logistic support from those offices was adequate.

Use of Indicators

The actual value of the indicators is less important than the trend, since although the sample size was larger enough to detect representative data, it was not stringent enough to have extremely precise results. No statistical tests were done to confirm significance. The purpose of the survey is to identify the magnitude of the problem rather than precise description; thus, most of the above limitations are acceptable.

Geographical Coverage

The results are not applicable countrywide, but to the extent that Kaolack and Thiès Districts are similar to other areas, the results may be useful to give an indication of problem areas.

CONCLUSIONS

The C-DMCI survey has highlighted strong and weak points in drug management of childhood illnesses at community level. Some of these issues had already been discovered in the DMCI survey of 2001, such as the low use of ORS in private pharmacies, or from other studies, such as the ESIS 1999 and PLAN's KPC study, thus validating the results, but others, both at the household and provider level, were not known. This community survey has generated results that will be useful for MoH planning both in the pharmacy and drugs sector and for child health and IMCI. The timing was particularly appropriate because the DAN is preparing the strategic plan of C-IMCI and intends to incorporate some of the recommendations of the C-DMCI survey. As drugs are a central part of correct case management by caregivers, their availability and appropriate use need to be ensured.

The identified weak points should be prioritized in order to target appropriate interventions for improving community drug management. Some of these interventions can be integrated into community-IMCI activities in selected districts and depending on their effectiveness may then be extended to other districts in order to widen the area of the impact. There are also some strong points that need to be appreciated and further strengthened or extended to other localities, where possible.

Studying each of the stages of the framework, we can draw some conclusions from the results of the C-DMCI survey.

1. The Caregiver Recognizes Symptoms

In order for a child to be managed appropriately, the caregiver needs to recognize the symptoms and assess their severity. Overall, there was good recognition of seriousness of severe malaria and pneumonia.

2. The Caregiver Seeks Timely Care from an Appropriate Source

Appropriate action was taken by caregivers of children with convulsions and fast breathing by seeking care outside the home at an appropriate source, although this was less common for pneumonia than for convulsions. Care seeking for cases of severe malaria and treatment of mild malaria was prompt but delay was observed for cases of pneumonia. Problems of providers not referring these serious cases to the health center were reported by caregivers.

3. The Caregiver Obtains Appropriate Drugs

The most startling finding of the survey is the nonexistence of ORS in private pharmacies and its low availability at health facilities. This factor certainly contributes to the low level of appropriate management of diarrhea cases. Overall, there is a reasonable availability of

chloroquine and co-trimoxazole in tablet form, but less so in health huts (although co-trimoxazole is currently not intended to be stocked at that level). Problems were noted with the availability of sulfadoxine/pyrimethamine in the public-sector clinics. Chloroquine, although present, was not widely available in the informal sector, unlike tetracycline. Syrups of these drugs, which are more suited for administering to children, are less available at all providers than the tablet form.

The majority of caregivers perceived that chloroquine and co-trimoxazole were always or at least sometimes available, in line with the availability findings, and around half felt that ORS was available in their locality more than the actual availability. In particular, there seems to be a low awareness of the product ORS among the caregivers surveyed.

Another aspect of access is the affordability of drugs. In general, most caregivers felt that chloroquine and co-trimoxazole were affordable, so the price of these drugs does not seem to be a barrier. However, very variable costs of drugs were noted across sectors and even between health huts and health posts and between districts.

It seems that only the informal sector procures drugs from the informal sector itself and the parallel market, thus implying a better quality of drugs in the formal sector.

Caregivers obtain their drugs mostly from appropriate sources (health facilities and pharmacies); the informal market is not so frequented for obtaining drugs for sick children. Few caregivers keep ORS or chloroquine in the home for home-based management of diarrhea and malaria, although some do keep antibiotics.

The particular drugs obtained by caregivers for the conditions studied are a result of the influence of the provider on the caregiver as well as other factors specific to the caregiver. Among the providers, there seemed to be a lack of awareness of the national standard treatments and the key symptoms of certain childhood conditions. Many providers stated they would recommend antibiotics for a case of ARI (non-pneumonia), and pneumonia was not recognized by most providers and was reportedly mistreated—co-trimoxazole was not used. Although most providers reported recommending chloroquine for most cases of fever, they did not tend to recommend ORS but rather used antidiarrheals and antibiotics for cases of uncomplicated diarrhea.

4. The Caregiver Uses Appropriate Drugs Correctly

Children with ARI (non-pneumonia) were overtreated with antibiotics, and few children with signs of pneumonia were given co-trimoxazole. This very serious issue is already being targeted by operational research with health workers at health huts to see if making co-trimoxazole available in the community and dispensed by a specially trained health worker will increase the rate of its use for cases of pneumonia.

Although caregivers are not using injections or antibiotics for malaria cases, which is a good indicator, the use of chloroquine remains low. This finding may be related to its perceived

availability or the fear that it is ineffective. The management of diarrhea was poor: caregivers do not use ORS and only some give increased fluids, but there is a low use of antidiarrheals. More cases of mild diarrhea received an antibiotic than the percentage of cases of bloody diarrhea that received co-trimoxazole.

The way the caregivers administer drugs to the child at home may be influenced by the information, if any, that they receive from the provider. The survey noted that in general the authorized providers of drugs communicated to some extent the mode of drug administration, although few gave written instructions on a label. However, it was also noted that some providers were not familiar with the correct dosing schedules for the key drugs: chloroquine and co-trimoxazole.

Whatever the reason, an inadequate administration of drugs in the home was noted. Chloroquine was given twice a day and for a variety of durations, some caregivers giving it for longer than three days, maybe thinking of prophylaxis. Co-trimoxazole was often given for less than five days, and few caregivers gave it according to the correct regimen.

Other Observations

Urban/Rural Differences

Although not all indicators were analyzed for rural/urban differences, some interesting trends were found.

The prevalence of pneumonia cases was higher in the rural areas. Caregivers from the rural areas tend to seek care more quickly for pneumonia. The providers in urban areas were reported to have referred cases of pneumonia and severe malaria to a health center more often, presumably due to the center's proximity.

Use of chloroquine was greater in urban areas than in rural areas. This finding could be linked to the caregivers' greater perceived availability of drugs in the urban areas. However, no differences in perceptions of affordability were noted between rural and urban areas.

Some differences are district-specific, such as co-trimoxazole for pneumonia being given more often in rural areas than urban in Kaolack, but the opposite in Thiès. The factors behind this finding would be interesting to explore in order to inform intervention development.

District Differences

The prevalence of diarrhea was greater in Kaolack than in Thiès, which is more likely to be due to geographic reasons, although the prevalence of malaria was similar.

Availability of drugs in the health huts surveyed in Kaolack was slightly better than in Thiès, although co-trimoxazole was also available when it should not be stocked at that level. In the informal market in Kaolack, greater drug availability was noted of drugs such as chloroquine,

S/P, and antibiotics. Overall, the perceived availability of chloroquine and co-trimoxazole was less in Kaolack, where more caregivers thought that those drugs were never available. However, in Kaolack more caregivers had chloroquine stored at home. Kaolack seems to have slightly more informal sector activity—caregivers report going to the boutique and market vendors—although this could result from a reticence to report that type of source in Thiès after the recent publicized arrest of the market drug vendor.

Some differences were noted also in the reported practices at drug outlets. In Kaolack respondents at health facilities reported a higher use of antibiotics for cases of non-pneumonia than in Thiès, although fewer respondents in health facilities reported recommending co-trimoxazole for cases of pneumonia; amoxicillin was used more often than co-trimoxazole. However, fewer caregivers used co-trimoxazole in Thiès than in Kaolack for children with symptoms of pneumonia. The reported use of antibiotics by the informal-sector vendors for cases of diarrhea was higher in Kaolack than in Thiès, presumably because of the higher availability of tetracycline.

Summary

The survey produced the following main findings, which are listed in order of the four steps previously mentioned—

- Overall, caregivers have a timely response to fever and convulsions but do not seek treatment for fast breathing (the key symptom of pneumonia) in a timely manner.
- In general, there is good availability of certain drugs such as chloroquine and co-trimoxazole in the drug outlets studied, but not necessarily at appropriate levels, for example, in health huts and the informal sector.
- There is poor availability of ORS, especially in private pharmacies; among caregivers there is a lack of awareness about ORS.
- Most caregivers get drugs for their sick children from the formal sector, with the implication being that intervention efforts (at least for child health) should target this sector.
- Many caregivers are not treating cases of fever with chloroquine; this is more pronounced in the rural areas than the urban areas.
- Caregivers in general do not manage diarrhea well with increased fluids and/or ORS.
- Caregivers give antibiotics to cases of fast breathing rarely but overtreat cases of ARI cough with antibiotics.
- Caregivers do not administer drugs for the correct length of time or with the correct frequency.

- All of these issues are complemented by provider practices. Health care providers and drug sellers surveyed seem not sufficiently familiar with national standard treatments and correct dosing schedules of those drugs.

Now that the main problems have been identified, further exploration is needed in some areas in order to develop appropriate interventions. For example, what influences the drugs that caregivers obtain—a prescription, the seller’s recommendation, the caregiver’s personal choice? Once these factors are explored, appropriate messages can be targeted at the community to improve drug acquisition practices.

What influences the drug administered to a sick child—the caregiver’s own knowledge or experience, information given by the provider, or the fact that the child recovers? The problem that was identified of twice-daily dosing with chloroquine results from an old recommendation that has now been replaced by once-daily dosing. The new message needs to be further disseminated and sensitization expanded because the change is not being implemented by caregivers or providers.

RECOMMENDATIONS AND NEXT STEPS

This report has discussed some strengths and weaknesses of community drug management of childhood illnesses, and certain interventions can be suggested to target the problems identified. In order to ensure involvement of the stakeholders in this process, a workshop was held in February 2003 to present the preliminary results and to discuss the problems identified by the survey. The major stakeholders from different sectors of the Ministry of Health (including those that deal with drugs and child health) were present, as well as other implementing partners such as district and regional health team representatives, NGOs, private sector pharmacists, donors, WHO, and UNICEF. In work groups, the participants of the workshop prioritized the problems resulting from the survey and then determined interventions for the priority problems. The majority of the interventions recommended in this report were proposed by the stakeholders, and there is commitment from the MoH to integrate as many as possible into their various strategic plans and implement them with the assistance of partner agencies and NGOs. The importance of the private sector in providing drugs was demonstrated by the survey, and the MoH realized the need to collaborate with the private sector bodies such as the *ordre* and *syndicat* of pharmacists in order to improve drug management for childhood illness at community level.

Within the interventions, it is important to prioritize areas that may have greatest impact. For example, as it was noted in the survey that health facilities and pharmacies are the primary sources of drugs, it is important to focus interventions on them initially. Health huts were not reported to be used extensively, and more exploration may identify the reasons why; is it poor service, inconvenient or irregular hours, or higher prices that influence whether caregivers use them?

Because malaria has a higher prevalence than diarrhea and pneumonia, an initial priority focus could be targeting interventions to improve drug management of malaria at community level. Also, since chloroquine use is already higher for malaria than the appropriate first-line treatments for pneumonia and diarrhea, it may be more effective to concentrate on improving appropriate drug use for a greater impact on child morbidity and mortality due to malaria.

The following recommended interventions have been grouped according to their level or target group. It is suggested to consider which interventions are priorities as discussed above and which are feasible, giving maximum impact to priority problem areas. Before implementing any interventions, further exploration may be required of the influencing factors that may promote certain behaviors. Qualitative methods can be used to obtain this information, keeping the field research contained, practical, and focused on the research questions of interest. Other reports can be exploited, such as ENDA 1995, ESIS 1999, and KPC 2002. However, it is expected that many of the decision makers and program managers in Senegal understand a lot of the influencing factors and the context.

Caregivers

Many interventions need to be targeted at the caregivers in order to change some of their practices in managing their sick children. However, it is important to reinforce some things that they are doing well, such as seeking care outside of the home for severe cases of malaria and pneumonia and the timely treatment of cases of severe malaria.

As with any behavior-change interventions, it is important to explore more of the influencing factors that may promote certain behaviors. Qualitative methods can be used to obtain this information, keeping the field research contained, practical, and focused on the research questions of interest. However, it is expected that many of the decision makers and program managers in Senegal understand a lot of the influencing factors and the context because their own family members or friends, or indeed they themselves, are also caregivers, which also can help inform the development of interventions.

1. Communicate messages to change behavior of caregivers through the media, local community groups of village leaders, women's groups, community health workers (*relais*), community organizations, and other mechanisms used by the PIC (*paquet intégré de communication*) as well as the providers themselves. Some examples of the subjects to be covered are—
 - Danger signs
 - Prompt action and appropriate sources of care
 - Drug availability
 - Management of fever with chloroquine
 - Management of diarrhea and use of ORS
 - Management of fast breathing with an antibiotic (Bactrim)
2. Encourage caregivers, through women's groups and community health workers, to demand instructions from the providers on how to administer the drugs.

Providers

The providers in both the public and private sector are a key point of contact for the caregiver and therefore in a good position to influence to some degree the behavior of the caregiver or at least to reinforce some messages. In order for them to do this, some of their own practices need to be improved. These interventions are a mix of training and capacity development through supervision and memory aids in both the public and private sector.

Public Sector

3. Continue to extend the IMCI training of health workers to reach national coverage.
4. Train staff of public health facilities in store management to ensure drug availability, including ORS.

5. Strengthen supervision and the semiannual monitoring by district health teams of health facilities, including the health hut and district stores, to monitor drug availability and use. Use observation as a method of determining whether providers are giving appropriate instructions about drug administration.
6. Improve communication between health workers and caregivers. Work with communication experts to improve verbal communication of drug dosing information and develop a way to write drug dose instructions that will be understood by the community.
7. Integrate messages promoting use and explaining preparation of ORS into other activities of the health post, such as prenatal care.

Private Sector

8. Organize information days for private pharmacists and other health care providers to familiarize them with IMCI guidelines and the national standard treatments.
9. Introduce a regular newsletter or information sheet, produced by the national *ordre* or *syndicat* of pharmacists, to disseminate messages to pharmacists of private pharmacies and their staff.
10. Conduct supervision or information visits through *ordre* or *syndicat* of pharmacists in collaboration with the MoH and hold regular meetings of local groups of pharmacists to discuss cases and learn through peer review.
11. Conduct training programs through the MoH, in collaboration with the *ordre* and *syndicat*, for pharmacy employees (counter agents) in treatment of common childhood illnesses and their appropriate treatment and doses, especially focusing on misuse of antibiotics and the preparation and use of ORS.
12. Develop and disseminate job aids and posters targeted at pharmacy drug sellers and caregivers to show how to administer the medicines. Distribution could take place through the private wholesalers.
13. Motivate wholesalers (including the public sector PNA and district stores) to stock resealable plastic bags for dispensing of drugs.

Policy

Certain interventions can be implemented only at the policy level, in order to facilitate impact on drug management at community level. Some suggestions follow of interventions that the MoH and its partners, including those of the private for-profit sector, could consider—

14. Improve the availability of chloroquine at community level by authorizing and developing the capacity of community health workers (*relais*) to distribute it.

15. Control and harmonize prices in the public sector both between districts and between levels of care.
16. Facilitate the availability of ORS in the private sector and actively promote it through social marketing.
17. Pre-package antimalarials to facilitate dosing decisions by providers and administration by caregivers.
18. Develop an accredited drug outlet system (a level under the pharmacy), where the seller is trained in recommending and selling certain appropriate drugs such as first-line antimalarials, antipyretics, and ORS.

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ANNEX 1. C-DMCI INDICATORS

Household Indicators

Descriptive Indicators	
1.	Age of children in sample in years
2.	Percentage of children in the sample who were male
3.	Percentage of respondents whose child had fever
4.	Percentage of respondents whose child had convulsions
5.	Percentage of respondents whose child had difficulty breathing/fast breathing
6.	Percentage of respondents whose child had diarrhea
7.	Percentage of respondents whose child had bloody diarrhea (of those who had diarrhea)
8.	Percentage of respondents whose child had bloody diarrhea (of total sample)
9.	Percentage of respondents whose child had a cough but no fast breathing
Decision to Treat Is Timely	
10.	Percentage of respondents who thought their child's illness was: <ul style="list-style-type: none"> • very serious • a little serious • not serious
11.	Percentage of respondents whose child had difficulty breathing/fast breathing, who sought care from a source outside the home
12.	Percentage of respondents whose child had difficulty breathing/fast breathing and who sought care from a source outside the home, who did so on the same day the difficulty breathing/fast breathing started
13.	Percentage of respondents whose child had difficulty breathing/fast breathing and who sought care from a source outside the home other than a health center, who were referred to a health center
14.	Percentage of respondents whose child had convulsions, who sought care from a source outside the home
15.	Percentage of respondents whose child had convulsions and who sought care from a source outside the home, who did so on the same day the convulsions started
16.	Percentage of respondents whose child had convulsions and who sought care from a source outside the home other than a health center, who were referred to a health center
17.	Percentage of respondents whose child had fever and received chloroquine, who received it on same day of fever onset or next day after illness started
Perceptions of Availability of Specific Drugs	
18.	Percentage of respondents who say they can always get chloroquine in the area in which they live
19.	Percentage of respondents who say they can always get co-trimoxazole in the area in which they live
20.	Percentage of respondents who say they can always get ORS in the area in which they live
Perceptions of Cost of Specific Drugs	
21.	Percentage of respondents who say chloroquine is affordable
22.	Percentage of respondents who say co-trimoxazole is affordable
23.	Percentage of respondents who say ORS is affordable

Source of Care or Drugs	
24.	Percentage of respondents whose child had convulsions and who sought care from a source outside the home, who went to source X outside the home as first source of care for convulsions
25.	Percentage of respondents whose child had difficulty breathing/fast breathing and who sought care from a source outside the home, who went to source X outside the home as first source of care for difficulty breathing/fast breathing
26.	Percentage of respondents whose child took chloroquine, who already had it at home
27.	Percentage of respondents whose child took co-trimoxazole, who already had it at home
28.	Percentage of respondents whose child took amoxicillin, who already had it at home
29.	Percentage of respondents whose child had diarrhea and who used ORS, who had it at home
30.	Percentage of respondents whose child took chloroquine, who report going to source X as original source of chloroquine
31.	Percentage of respondents whose child took co-trimoxazole, who report going to source X as original source of co-trimoxazole
32.	Percentage of respondents whose child took amoxicillin, who report going to source X as original source of amoxicillin
33.	Percentage of respondents who report going to source X as original source of co-trimoxazole and amoxicillin
34.	Percentage of respondents whose child had diarrhea and who used ORS, who report going to source X as original source of ORS
Choice of Drugs	
35.	Percentage of respondents whose child had fever and took chloroquine
36.	Percentage of respondents whose child had convulsions and took chloroquine
37.	Percentage of respondents whose child had difficulty breathing/fast breathing and took co-trimoxazole
38.	Percentage of respondents whose child had diarrhea and took ORS
39.	Percentage of respondents whose child had bloody diarrhea and took co-trimoxazole
40.	Percentage of respondents whose child had bloody diarrhea and took co-trimoxazole, who took ORS also
41.	Percentage of respondents whose child had diarrhea who took an antidiarrheal drug
42.	Percentage of respondents whose child had diarrhea (not bloody) and took any antibiotic
43.	Percentage of respondents whose child had cough and no difficulty/fast breathing and took any antibiotic
Administration of Drugs	
44.	Percentage of respondents getting chloroquine and who were told the length of treatment course at source X
45.	Percentage of respondents getting co-trimoxazole and who were told the length of treatment course at source X
46.	Percentage of respondents getting amoxicillin who were told the length of treatment course at source X
47.	Percentage of respondents whose child took chloroquine for three days (among those whose child took chloroquine)
48.	Percentage of respondents whose child took co-trimoxazole for five days (among those whose child took co-trimoxazole)
49.	Percentage of respondents whose child took amoxicillin for five days (among those whose child took amoxicillin)

50.	Percentage of respondents whose child took chloroquine correctly (once a day for three days) (among those whose child took chloroquine)
51.	Percentage of respondents whose child took co-trimoxazole correctly (twice a day for five days) (among those whose child took co-trimoxazole)
52.	Percentage of respondents whose child took amoxicillin correctly (three times a day for five days) (among those whose child took amoxicillin)
Management of Diarrhea	
53.	Percentage of respondents whose child had diarrhea and was given more fluid than usual

Provider Indicators

Description of the Sample	
	a. Distribution of the outlets surveyed as % of total sample
	b. Distribution of the outlets surveyed in an urban milieu
Distribution of Drug Outlets Attendants Based on Level of Training	
	Pharmacist
	Medical doctor
	Nurse, nurse midwife
	Medical technician, lab technician
	Other health-related training
	Percentage of attendants with NO training in clinical care
Drug Outlet's Distance from the Nearest Health Facility	
	Under 1 km (or less than 15 minutes walking)
	Between 1 and 5 km (up to one hour walking)
	More than 5 km (more than one hour walking)
Part I. Indicators of Reported Treatment Practices for Specific Hypothetical Cases	
<i>ARI (non-pneumonia)</i>	
1	Percentage of respondents who report they would recommend an antibiotic for children with symptoms of non-pneumonia ARI
2	Percentage of respondents who report they would recommend the key STG drug for children with symptoms of non-pneumonia ARI
3	Percentage of providers who would recommend nothing for children with symptoms of non-pneumonia ARI
4	Percentage of providers who would refer the case
<i>Pneumonia</i>	
5	Percentage of respondents who report they would recommend an antibiotic for children with symptoms of pneumonia
6	Percentage of respondents who report they would recommend an injection for children with symptoms of pneumonia
7	Percentage of respondents who report they would recommend co-trimoxazole for children with symptoms of pneumonia
8	Percentage of respondents who would refer the case
9	Percentage of respondents who mentioned the recommended daily dosing regimen for co-trimoxazole for pneumonia in children
10	Percentage of respondents who mentioned the recommended duration for co-trimoxazole for pneumonia in children
<i>Malaria</i>	
11	Percentage of respondents who report they would recommend any antimalarial for children with symptoms of malaria
12	Percentage of respondents who report they would recommend an antibiotic for children with symptoms of malaria

13	Percentage of respondents who report they would recommend an injection for children with symptoms of malaria
14	Percentage of respondents who report they would recommend chloroquine for children with symptoms of malaria
15	Percentage of respondents who would refer the case
16	Percentage of respondents who mentioned the recommended daily dosing regimen for chloroquine for malaria in children
17	Percentage of respondents who mentioned the recommended treatment duration for chloroquine for malaria in children
Diarrhea	
18	Percentage of respondents who report they would recommend an antibiotic for a child with mild diarrhea
19	Percentage of respondents who report they would recommend an antidiarrheal drug for a child with mild diarrhea
20	Percentage of respondents who report they would recommend ORS for a child with mild diarrhea
21	Percentage of respondents who report they would recommend only ORS for a child with mild diarrhea
22	Percentage of respondents who would refer the case
Part II. Indicators of Availability	
23	Percentage of outlets with a specific first-line drug in stock
24	Percentage of outlets with a specific second/third-line drug in stock
25	Percentage of outlets with specific inappropriate drugs for child health available
26	Percentage of outlets with co-trimoxazole tablets but no syrup
27	Percentage of outlets with chloroquine tablets but no syrup
28	Percentage of outlets that have amoxicillin for pneumonia but not co-trimoxazole
29	Percentage of outlets with antidiarrheal but not ORS available in stock
30	Percentage of outlets that have S/P but no chloroquine
31	Average cost [and range] for a treatment of co-trimoxazole syrup for a two-year-old child
32	Average cost [and range] for a treatment of amoxicillin syrup for a two-year-old child
33	Average cost [and range] for a treatment of co-trimoxazole tablets for a two-year-old child
34	Average cost [and range] for a treatment of amoxicillin tablets for a two-year-old child
35	Average cost [and range] for a treatment of ORS in a two-year-old child
36	Average cost [and range] for a treatment of chloroquine syrup for a two-year-old child
37	Average cost [and range] for a treatment of chloroquine tablets for a two-year-old child
38	Average cost [and range] for a treatment of S/P tablets for a two-year old-child
Part III. Indicators of Stock Movement	
39	Most commonly sold or dispensed drugs for pneumonia in children
40	Percentage of providers mentioning co-trimoxazole as the most commonly sold or dispensed drug for pneumonia
41	Percentage of outlets mentioning amoxicillin as the most commonly sold or dispensed for pneumonia
42	Average sales volume of co-trimoxazole
43	Average sales volume of amoxicillin
44	Ratio of the sales volume of amoxicillin to co-trimoxazole

45	Most commonly sold or dispensed drugs for diarrhea in children
46	Percentage of outlets mentioning ORS as the most commonly sold or dispensed drug for diarrhea in children
47	Percentage of outlets mentioning an antidiarrheal as the most commonly sold or dispensed drug for diarrhea in children
48	Most commonly sold or dispensed drugs for malaria in children
49	Percentage of providers mentioning chloroquine as the most commonly sold or dispensed drug for malaria in children
50	Percentage of outlets mentioning S/P as the most commonly sold or dispensed drug for malaria in children
51	Average sales volume of chloroquine
52	Average sales volume of S/P
53	Ratio of the sales volume of the S/P to chloroquine
Part IV. Indicators of Quality of Dispensing	
54	Percentage of providers dispensing loose tablets that use appropriate packaging
55	Percentage of providers dispensing tablets with a label containing patient name, drug name, dose, frequency, and duration
56	Percentage of providers that use appropriate packaging to dispense syrup or suspension
57	Percentage of providers that dispense syrups with a label containing patient name, drug name, dose, frequency, and duration

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ANNEX 3. TRACER DRUGS AND SUPPLIES

Senegal C-DMCI Tracer List of Drugs

1	Actapulgate
2	Amoxicillin caps
3	Amoxicillin syrup
4	Amoxicillin + clavulanic acid (Augmentin) syrup
5	Artesunate tabs
6	Cefadroxil syrup
7	Chloroquine syrup
8	Chloroquine tabs
9	Co-trimoxazole syrup
10	Co-trimoxazole tabs
11	Halofantrine syrup
12	Metronidazole syrup
13	ORS
14	Quinine injection
15	Sulfadoxine/pyrimethamine tabs
16	Tetracycline caps
17	Ultralevure sachet

ANNEX 4. TRAINING SCHEDULE

Day 1—Tuesday, August 27

Time	Trainees Involved	Location	Activity	Persons Responsible
8:30–8:45	All data collectors	Main room	Contract discussion	Ndoye
8:45–9:15	All data collectors	Main room	Welcome/icebreaker Why we are here Overview of training and schedule	Nancy Nancy Nancy
9:15–10:00	All data collectors	Main room	Overview of important topic areas: <ul style="list-style-type: none"> • Malaria • ARI • Diarrhea • Drug management/use issues and why understanding them is important 	Nancy and Jane
10:00 –10:30	All data collectors	Main room	Overview of research project <ul style="list-style-type: none"> • General • Household • Provider/drug seller Purpose of field test/country application Role of data collectors	Nancy and Jane
10:30–10:45			Break	
10:45–11:45	All data collectors	Main room	Introduction to doing a survey Interviewing techniques Recording techniques	Nancy
11:45–13:30	Household data collectors	Separate room	Introduction to household data collection tools and procedures <ul style="list-style-type: none"> • Overview of purpose of instrument, type of information collected, from whom, and how • Detailed review of each question and responses (French/Wolof) 	Nancy and HH supervisors

Time	Trainees Involved	Location	Activity	Persons Responsible
11:45–13:30	Provider/drug outlet data collectors	Separate room	Introduction to provider/drug seller data collection tools and procedures <ul style="list-style-type: none"> Overview of purpose of instrument, type of information collected, from whom, and how Detailed review of each question and responses (French/Wolof) 	Jane, Ndoeye, and provider supervisors
13:30–14:30	Everyone		Lunch	
14:30–16:30	Household data collectors	Separate room	Ongoing introduction to household data collection tools and procedures <ul style="list-style-type: none"> Detailed review of each question and responses (continued) Role-plays/practice with questionnaire administration (including recording) (French) 	Nancy and HH supervisors
14:30–16:30	Provider/ drug outlet data collectors	Separate room	Ongoing introduction to provider data collection tools and procedures <ul style="list-style-type: none"> Detailed review of each question and responses (continued) Role-plays/practice with questionnaire administration (including recording) (French) 	Jane, Ndoeye, and provider supervisors
16:30–17:00	All data collectors	Main room	Discuss any questions/issues from afternoon Review of next day's activities Homework assignment: <ul style="list-style-type: none"> Review and practice Wolof version of questionnaire 	Nancy and team
17:00			End Session	

Day 2—Wednesday, August 28

Time	Trainees Involved	Location	Activity	Persons Responsible
9:00–9:30	All data collectors	Main room	Discussion of homework and any issues/questions Review of day's activities	Nancy and team
9:30–10:30	Household data collectors	Main room	Role plays with Wolof version of questionnaire (including recording)	Nancy and HH supervisors
9:30–10:30	Provider/drug outlet data collectors	Separate room	Role plays with Wolof version of questionnaire (including recording)	Jane, Ndoeye, and provider supervisors
10:30–10:45			Break	
10:30–12:15	Household data collectors	Main room	Role plays with Wolof version of questionnaire (including recording) continues Questionnaire verification	Nancy and HH supervisors
10:30–12:15	Provider/drug outlet data collectors	Separate room	Role plays with Wolof version of questionnaire (including recording) continues Questionnaire verification	Jane, Ndoeye, and provider supervisors
12:15–13:00	All data collectors	Main room	Discussion of village entry/facility entry/shop entry— protocols, dress, difficult situations, reacting to respondents, etc.	Nancy and team
13:00–13:30	All data collectors	Main room	Discussion of how sampling of the two surveys are linked	Ndoeye
13:30–14:30			Lunch	
14:30–15:15	Household data collectors	Main room	Review of how to find/select respondents (urban setting and household level)	Household supervisors
14:30–15:15	Provider/drug outlet data collectors	Separate room	Review of how to find/select respondents (urban setting and facility/outlet level)	Ndoeye and provider supervisors
15:15–16:00	All data collectors	Main room	Discuss any questions/issues from afternoon Preparation for next day's fieldwork Homework assignment: review questionnaire and practice if possible	Nancy and team
16:00			End Session (for data collectors)	
16:00 –17:00	Supervisors		Preparations for fieldwork	Ndoeye

Day 3—Thursday, August 29

Time	Trainees Involved	Location	Activity	Persons Responsible
8:30–8:45	All data collectors	Main room	Organization for urban fieldwork	Ndoye
8:45–13:30	All data collectors	Urban field site	Practice in the field	Ndoye and team
13:30–14:30			Lunch	
14:30–15:15	All data collectors	Main room	General debriefing on fieldwork	Ndoye
15:15–16:45	Household data collectors	Main room	Detailed debriefing on fieldwork and issues/problems/questions arising from field practice, including any needed changes to sampling or questionnaire Questionnaire verification/cover sheet coding Discussion of finding households in rural setting	Nancy and HH supervisors
15:15–16:45	Provider/drug outlet data collectors	Separate room	Detailed debriefing on fieldwork and issues/problems/questions arising from field practice, including any needed changes to sampling or questionnaire Questionnaire verification Discussion of finding providers in rural setting	Jane, Ndoye, and provider supervisors
16:45–17:00	All data collectors	Main room	Wrap-up and preparation for next day's fieldwork	Ndoye and supervisors
17:00			End Session (for data collectors)	
17:00–17:45	Supervisors		Preparations for fieldwork	Ndoye

Day 4—Friday, August 30

Time	Trainees Involved	Location	Activity	Persons Responsible
8:30–8:45	All data collectors	Main room	Organization for rural fieldwork	Ndoye
8:45–13:30	All data collectors	Rural field site	Practice in the field	Ndoye and team
13:30–14:30			Lunch	
14:30–15:00	All data collectors	Main room	General debriefing on field work	Ndoye
15:00–16:00	Household data collectors	Main room	Detailed debriefing on fieldwork and issues/problems/questions arising from field practice, including any needed changes to sampling or questionnaire Questionnaire verification/cover sheet coding	Nancy and HH supervisors
15:00–16:00	Provider / drug outlet data collectors	Separate room	Detailed debriefing on fieldwork and issues/problems/questions arising from field practice, including any needed changes to sampling or questionnaire Questionnaire verification	Jane, Ndoye, and provider supervisors
16:00–17:00	All data collectors	Main room	Discussion of data collection schedule and logistics <ul style="list-style-type: none"> • Overview of next 2 weeks of data collection, including logistics • Overview of first day of data collection, including logistics Homework assignment: review and practice instruments and sampling	Ndoye and supervisors
17:00			End Session (for data collectors)	
17:00–18:00	Supervisors		Prepare for data collection	Ndoye

ANNEX 5. DISTRIBUTION OF SITES PER DISTRICT

Thiès District

n. site	Arrondissement	Commune/ Communauté Rural	Quartiers/Villages	Hameaux
Urban				
1	Thiès	Thiès	Thialy	
2			Wango	
3			HLM Thialy (Cite Ohlm)	
4			Cite Lamy (Ndioung)	
5			HLM 10eme (Cite Ohlm)	
6			Silmang	
7			Nguinthe	
8			Takhikao	
9			Camp GMI (ex-tropical)	
10			Keur Sampathe	
11			Mbour 1	
12			Som	
13		Pout	Pout centre ville	
Rural				
14	Notto	Notto	Tueb dal/ Notto et K Diatta (15)	
15	Notto	Notto	Mandangri Ouolof K N'diol Dieng (9)	Mboufoudji de Mbousnakh Gotte (6)
16	Notto	Tassette	Nguinthe Ouolof Nguinthe Toucouleur (Nguinthe Peule) Nguinthe Serere Dieling (7)	Nguinthe Keur Youga Keur Yoro de Nguinthe Serere Khayegui de Guinthe Serere Keur Ndiara Sene Keur Bala Keur Assane Wele Dieling Serere (8)
17	Keur Moussa	Diender Guedji	Bayakh (15)	

n. site	Arrondissement	Commune/ Communauté Rural	Quartiers/Villages	Hameaux
18	Keur Moussa	Diender Guedji	Thieudeme Mbidieum Lebou Wakhal (6) Mbidieum Ouolof	Projet Maitrisards (9)
19	Keur Moussa	Keur Moussa	Keur Moussa /Ndoyen Peul (15)	
20	Keur Moussa		Keur Yakham (15)	

Kaolack District

n. site	Arrondissement	Commune/ Communauté Rural	Quartier/ Village	Hameaux
Urban				
1		Kaolack	Taba Ngoye	
2			Leona	
3			Sam	
4			Kassa Ville	
5			Camps des gardes	
6			HLM Bongre	
7			Ndorong	
8			Ndorong Sadaga	
9			Medina	
10			Sama Moussa (+.....)	
11			Thioffac	
12			Bongre	
13		Ndoffane	Ndoffane	
Rural				
14	Koumbal	Thiare	Thindogne K Safady K Mandiaye (14)	Samba Niery K. Gallo K. Ndoulo (1)

Annex 5. Distribution of Sites per District

n. site	Arrondissement	Commune/ Communauté Rural	Quartier/ Village	Hameaux
15	Koumbal	Latmingue	K Yorodou Bambara K Yorodou Wolof K Soutara Diombo K Mor Sauté K Diombo Ndiouffane K Soutoura Mbodji Lohene (15)	
16	Ndiendieng	Ndiaffate	Koutal Ouolof (15)	
17	Ndiendieng	Ndiendieng	Santhie Ndiayene K Mamadou Bouya K Baily Ba K Bano Gory K Bano Ouolof Lohene (15)	
18	Ndiendieng	Ndiendieng	K Bocar Diallo Thysse K Guirane K Kabe K Guirane Ouolof K Guirane Peulh K Guirane Serere (15)	
19	Sibassor	Ndiebel	Boubandyame Ndiba (11)	Ngor Ngom de same Wadiour de Ndiebel Tewrou Timack de Ndiebel (4)
20	Sibassor	Thiomby Bambara	Khalambasse (7)	Ngary Lao M'Bokhodoff (8) (Khalambasse)

ANNEX 6. RESULTS OF THE C-DMCI INDICATORS IN SENEGAL

Household Results

Indicators		Thiès	Kaolack
	Descriptive Indicators		
1.	Age of children in sample in years 0–1 1–2 2–3 3–4 4–5	n = 300 23% 22% 23% 16% 16%	n = 300 27% 24% 24% 14% 11%
2.	Percentage of children in the sample who were male	52%	54%
3.	Percentage of respondents whose child had fever	90%	91%
4.	Percentage of respondents whose child had convulsions	2%	2%
5.	Percentage of respondents whose child had difficulty breathing/fast breathing	21%	22%
6.	Percentage of respondents whose child had diarrhea	38%	51%
7.	Percentage of respondents whose child had bloody diarrhea (of those who had diarrhea)	14% n = 110	22% n = 152
8.	Percentage of respondents whose child had bloody diarrhea (of total sample)	5% n = 300	11% n = 300
9.	Percentage of respondents whose child had a cough but no fast breathing	40% n = 300	40% n = 300
	Decision to Treat Is Timely		
10.	Percentage of respondents who thought their child's illness was: • very serious • a little serious • not serious	n = 296 33% 55% 12%	n = 298 28% 44% 28%

Indicators		Thiès	Kaolack
11.	Percentage of respondents whose child had difficulty breathing/fast breathing, who sought care from a source outside the home	74% n = 62	83% n = 56
12.	Percentage of respondents whose child had difficulty breathing/fast breathing and who sought care from a source outside the home, who did so <ul style="list-style-type: none"> • on the same day the difficulty breathing/fast breathing started • the next day • 2 days later • 3 or more days 	n = 46 30% 28% 17% 24%	n = 47 25% 34% 17% 23%
13.	Percentage of respondents whose child had difficulty breathing/fast breathing and who sought care from a source outside the home other than a health center, who were referred to a health center	30% n = 37	20% n = 40
14.	Percentage of respondents whose child had convulsions, who sought care from a source outside the home for convulsions	100% n = 7	100% n = 5
15.	Percentage of respondents whose child had convulsions and who sought care from a source outside the home for convulsions, who did so <ul style="list-style-type: none"> • on the same day the convulsions started • the next day 	n = 7 86% 14%	n = 5 80% 20%
16.	Percentage of respondents whose child had convulsions and who sought care from a source outside the home other than a health center, who were referred to a health center	17% n = 6	0 n = 2
17.	Percentage of respondents whose child had fever and received chloroquine who received it on same day of fever onset or next day after illness started	100% n = 153	100% n = 149
Perceptions of Availability of Specific Drugs			
18.	Percentage of respondents who say they can get chloroquine in the area in which they live: <ul style="list-style-type: none"> • always • sometimes • never 	n = 296 67% 22% 9%	n = 299 53% 19% 24%
19.	Percentage of respondents who say they can get co-trimoxazole in the area in which they live: <ul style="list-style-type: none"> • always • sometimes • never 	n = 291 63% 29% 3%	n = 298 57% 21% 18%
20.	Percentage of respondents who say they can get ORS in the area in which they live: ^a <ul style="list-style-type: none"> • always • sometimes • never 	n = 184 36% 27% 15%	n = 177 25% 12% 41%

Indicators		Thiès	Kaolack
Perceptions of Cost of Specific Drugs			
21.	Percentage of respondents who say chloroquine is affordable	91% n = 297	82% n = 299
22.	Percentage of respondents who say co-trimoxazole is affordable	89% n = 291	81% n = 297
23.	Percentage of respondents who say ORS is affordable ^b	56% n = 184	48% n = 177
Source of Care or Drugs			
24.	Percentage of respondents whose child had convulsions and sought care from a source outside the home who went to the following sources outside the home as first source of care for convulsions: <ul style="list-style-type: none"> • Traditional healer • Health post • Health center • Private clinic • Pharmacy • Boutique • Market • Health hut 	n = 7 14% 57% 14% 0 0 0 0 14%	n = 5 0 20% 60% 20% 0 0 0 0
25.	Percentage of respondents whose child had difficulty breathing/fast breathing and who sought care from a source outside the home who went to the following sources outside the home as first source of care for difficulty breathing/fast breathing: <ul style="list-style-type: none"> • Traditional healer • Health post • Health center • Private clinic • Pharmacy • Boutique • Market • Health hut 	n = 46 9% 37% 17% 28% 4% 0% 0% 2% 2%	n = 47 4% 43% 17% 6% 2% 6% 2% 15% 4%

^a22 percent in each district did not know.

^b41 percent (Thiès) and 52 percent (Kaolack) did not know.

Indicators		Thiès	Kaolack
26.	Percentage of respondents whose child took chloroquine who already had it at home	36% n = 157	54% n = 159
27.	Percentage of respondents whose child took co-trimoxazole who already had it at home	7% n = 68	14% n = 58
28.	Percentage of respondents whose child took amoxicillin who already had it at home	0 (n = 9)	40% n = 5
29.	Percentage of respondents whose child had diarrhea and who used ORS, who had it at home	25% n = 28	23% n = 22
30.	Percentage of respondents whose child took chloroquine, who report going to the following sources as original source of chloroquine: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut • Other 	n = 157 0 41% 18% 34% 1% 1% 3% 2%	n = 159 0 33% 9% 48% 3% 1% 1% 4%
31.	Percentage of respondents whose child took co-trimoxazole, who report going to the following sources as original source of co-trimoxazole: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut • Other 	n = 68 0 44% 13% 34% 2% 2% 4% 0%	n = 58 0 34% 4% 38% 14% 2% 2% 7%
32.	Percentage of respondents whose child took amoxicillin who report going to the following sources as original source of amoxicillin: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut 	n = 9 0 44% 22% 33% 0 0 5%	n = 5 0 20% 20% 60% 0 0 0

Indicators		Thiès	Kaolack
33.	Percentage of respondents who report going to the following sources as original source of co-trimoxazole and amoxicillin: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut • Other 	n = 77 0 44% 14% 34% 1% 1% 4%	n = 63 0 38% 3% 40% 11% 2% 3% 3%
34.	Percentage of respondents whose child had diarrhea and who used ORS, who report going to the following sources as original source of ORS: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut 	n = 28 0 61% 0% 32% 4% 0 4%	n = 23 0 56% 22% 22% 0 0 0
Choice of Drugs			
35.	Percentage of respondents whose child had fever and took chloroquine	57% n = 270	56% n = 271
36.	Percentage of respondents whose child had convulsions and took chloroquine	57% n = 7	80% n = 5
37.	Percentage of respondents whose child had difficulty breathing/fast breathing and took co-trimoxazole	14% n = 62	23% n = 69
38.	Percentage of respondents whose child had diarrhea and took ORS	25% n = 112	15% n = 152
39.	Percentage of respondents whose child had bloody diarrhea and took co-trimoxazole	19% n = 16	12% n = 33
40.	Percentage of respondents whose child had bloody diarrhea and took co-trimoxazole, who took ORS also	100% n = 3	75% n = 4
41.	Percentage of respondents whose child had diarrhea who took an antidiarrheal drug	16% n = 113	3% n = 152
42.	Percentage of respondents whose child had diarrhea (not bloody) and took any antibiotic	29% n = 93	22% n = 117

Indicators		Thiès	Kaolack
43.	Percentage of respondents whose child had cough and no difficulty/fast breathing and took any antibiotic	22% n = 118	22% n = 118
Administration of Drugs			
44.	Percentage of respondents getting chloroquine and who were told the length of treatment course at the following sources:		
	• Traditional healer	n = 0	n = 0
	• Health facility	94% n = 64	96% n = 52
	• Private clinic	86% n = 29	73% n = 15
	• Pharmacy	88% n = 55	87% n = 77
	• Boutique	0 n = 1	20% n = 5
	• Market	0 n = 2	50% n = 2
	• Health hut	80% n = 5	100% n = 1
	• Other	33% n = 3	83% n = 6

Indicators		Thiès	Kaolack
45.	Percentage of respondents getting co-trimoxazole and who were told the length of treatment course at the following sources: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut • Other 	n = 0 100% n = 30 100% n = 9 87% n = 23 0 n = 1 0 n = 1 100% n = 3 100% n = 1	n = 0 80% n = 20 100% n = 2 77% n = 22 0 n = 8 0 n = 1 100% n = 1 50% n = 4
46.	Percentage of respondents getting amoxicillin who were told the length of treatment course at the following sources: <ul style="list-style-type: none"> • Traditional healer • Health facility • Private clinic • Pharmacy • Boutique • Market • Health hut 	n = 0 100% n = 4 100% n = 2 100% n = 3 n = 0 n = 0 n = 0	n = 0 100% n = 1 100% n = 1 67% n = 3 n = 0 n = 0 n = 0

Indicators		Thiès	Kaolack
47.	Percentage of respondents whose child took chloroquine for 3 days (among those whose child took chloroquine) <ul style="list-style-type: none"> • Less than 3 days • More than 3 days 	53% n = 156 8% 26%	63% n = 160 11% 14%
48.	Percentage of respondents whose child took co-trimoxazole for 5 days (among those whose child took co-trimoxazole) <ul style="list-style-type: none"> • Less than 5 days • 6–7 days • more than 7 days 	25% n = 68 32% 18% 9%	15% n = 59 39% 12% 12%
49.	Percentage of respondents whose child took amoxicillin for 5 days (among those whose child took amoxicillin) <ul style="list-style-type: none"> • Less than 5 days • 6–7 days • more than 7 days 	17% n = 23 13% 39% 9%	9% n = 11 11% 36% 9%
50.	Percentage of respondents whose child took chloroquine correctly (once a day for 3 days) (among those whose child took chloroquine) <ul style="list-style-type: none"> • Those who took CQ twice per day • Those who took CQ once a day 	7% n = 156 68% 19%	8% n = 160 72% 19%
51.	Percentage of respondents whose child took co-trimoxazole correctly (twice a day for 5 days) (among those whose child took co-trimoxazole)	25% n = 68	10% n = 59
52.	Percentage of respondents whose child took amoxicillin correctly (correctly 3 times a day for 5 days) (among those whose child took amoxicillin)	4% n = 23	0 n = 11
Management of Diarrhea			
53.	Percentage of respondents whose child had diarrhea and was given more fluid than usual	68% n = 112	61% n = 151

Results from the Drug Providers: Kaolack

Indicators	Type of Provider				All N = 133
	Health Facilities n = 38	Pharmacies n = 32	Health Huts n = 30	Other Vendors n = 33	
Description of the sample					
a. Distribution of the outlets surveyed as % of total sample	29%	24%	22%	24%	
b. Distribution of the outlets surveyed in an urban milieu	37%	81%	10%	47%	43%
Distribution of drug outlets attendants based on level of training					
Pharmacist	2%	44%			12%
Medical doctor	13%				3%
Nurse, nurse midwife	66%				16%
Medical technician, lab technician	5%			3%	2%
Other health related training	13%	56%	100%		42%
Percentage of attendants with NO training in clinical care				97%	24%
Drug outlets' distance from the nearest health facility					
Under 1 km (or less than 15 minutes walking)		100%		91%	48%
Between 1 and 5 km (up to one hour walking)			33%	9%	11%
More than 5 km (more than one hour walking)			67%		17%
Part I. Indicators of Reported Treatment Practices for Specific Hypothetical Cases					
ARI (non-pneumonia)					
1 Percentage of respondents who report they would recommend an antibiotic for children with symptoms of non-pneumonia ARI	71%	47%	23%	25%	42%
2 Percentage of respondents who report they would recommend the key STG drug for children with symptoms of non-pneumonia ARI	37%	22%	17%	3%	20%
3 Percentage of providers who would recommend nothing for children with symptoms of non-pneumonia ARI	0	0	6%	30%	
4 Percentage of providers who would refer the case	3%	6%	33%	36%	
Pneumonia					
5 Percentage of respondents who report they would recommend an antibiotic for children with symptoms of pneumonia	39%	6%	0%	0%	12%
6 Percentage of respondents who report they would recommend an injection for children with symptoms of pneumonia	2%	0%	0%	0%	0.7%

Indicators	Type of Provider				All N = 133
	Health Facilities	Pharmacies	Health Huts	Other Vendors	
	n = 38	n = 32	n = 30	n = 33	
7 Percentage of respondents who report they would recommend co-trimoxazole for children with symptoms of pneumonia	10%	0%	0%	0%	2%
8 Percentage of respondents who would refer the case	34%	75%	73%	67%	
9 Percentage of respondents who mentioned the recommended daily dosing regimen for co-trimoxazole for pneumonia in children	8%	0%	0%	0%	2%
10 Percentage of respondents who mentioned the recommended duration for co-trimoxazole for pneumonia in children	7%	0%	0%	0%	2%
Malaria					
11 Percentage of respondents who report they would recommend any antimalarial for children with symptoms of malaria	92%	84%	73%	56%	76%
12 Percentage of respondents who report they would recommend an antibiotic for children with symptoms of malaria	6%	0%	0%	0%	1%
13 Percentage of respondents who report they would recommend an injection for children with symptoms of malaria	3%	0%	0%	0%	
14 Percentage of respondents who report they would recommend chloroquine for children with symptoms of malaria	82%	53%	70%	52%	64%
15 Percentage of respondents who would refer the case	5%	3%	10%	9%	
16 Percentage of respondents who mentioned the recommended daily dosing regimen for chloroquine for malaria in children	13%	0%	20%	6%	10%
17 Percentage of respondents who mentioned the recommended treatment duration for chloroquine for malaria in children	71%	40%	63%	27%	50%
Diarrhea					
18 Percentage of respondents who report they would recommend an antibiotic for a child with mild diarrhea	26%	31%	10%	63%	32%
19 Percentage of respondents who report they would recommend an antidiarrheal drug for a child with mild diarrhea	13%	65%	0%	0%	20%
20 Percentage of respondents who report they would recommend ORS for a child with mild diarrhea	92%	37%	83%	6%	54%

		Type of Provider				All
		Health Facilities	Pharmacies	Health Huts	Other Vendors	
Indicators		n = 38	n = 32	n = 30	n = 33	N = 133
21	Percentage of respondents who report they would recommend only ORS a child with mild diarrhea	57%	9%	63%	3%	33%
22	Percentage of respondents who would refer the case	3%	0	7%	21%	
Part II. Indicators of Availability						
23	Percentage of outlets with a specific first-line drug in stock					
	Chloroquine tablets	87%	100%	77%	79%	85%
	Chloroquine syrup	76%	100%	30%	6%	54%
	Co-trimoxazole tablets	73%	100%	42%	78%	73%
	Co-trimoxazole syrup	63%	94%	20%	0%	44%
	ORS	60%	0%	23%	0%	21%
24	Percentage of outlets with a specific second/third-line drug in stock					
	Amoxicillin capsules	77%	100%	3%	18%	49%
	Amoxicillin syrup	65%	93%	3%	0%	40%
	Quinine injection	79%	96%	10%	0%	46%
	S/P tablets	26%	96%	0%	42%	41%
25	Percentage of outlets with specific inappropriate drugs for child health available					
	Actapulgit sachet	10%	96%	0%	0%	26%
	Augmentin syrup	6%	81%	0%	0%	21%
	Artesunate tablets	0%	90%	0%	0%	21%
	Cefadroxil syrup	0%	93%	0%	0%	22%
	Metronidazole syrup	47%	93%	3%	0%	35%
	Tetracycline capsules	68%	21%	6%	84%	47%
	Ultralevure sachets	6%	78%	0%	0%	21%
	Halfan tablets	0%	91%	0%	0%	22%
26	Percentage of outlets with co-trimoxazole tablets but no syrup	15%	3%	30%	64%	28%
27	Percentage of outlets with chloroquine tablets but no syrup	15%	3%	53%	72%	35%
28	Percentage of outlets that have amoxicillin for pneumonia but no co-trimoxazole	0%	0%	0%	0%	
29	Percentage of outlets with antidiarrheal and not ORS available in stock	2%	96%	0%	0%	24%
30	Percentage of outlets that have S/P but no chloroquine	0%	0%	0%	3%	

Indicators	Type of Provider				All N = 133
	Health Facilities	Pharmacies	Health Huts	Other Vendors	
	n = 38	n = 32	n = 30	n = 33	
31 Average cost [and range] for a treatment of co-trimoxazole syrup for a two-year-old child	693 XOF (375–937)	1296 XOF (795–2437)	954 XOF (622–1500)		(375–2437)
32 Average cost [and range] for a treatment of amoxicillin syrup for a two-year-old child	683 XOF (360–997)	1222 XOF (520–2580)	750 XOF (750–750)		(360–2580)
33 Average cost [and range] for a treatment of co-trimoxazole tablets for a two-year-old child	132 XOF (100–300)	1055 XOF (141–2270)	197 XOF (196–250)	185 XOF (100–250)	(100–2270)
34 Average cost [and range] for a treatment of amoxicillin tablets for a two-year-old child	541 XOF (200–900)	1173 XOF (1113–2535)	1200 XOF (1200–1200)	280 XOF (150–375)	(150–2535)
35 Average cost [and range] for a treatment of ORS in a two-year-old child	100 XOF (50–300)		107 XOF (30–150)		(30–300)
36 Average cost [and range] for a treatment of chloroquine syrup for a two-year-old child	278 XOF (123–622)	280 XOF (262–656)	347 XOF (311–435)	311 XOF (311–311)	(123–656)
37 Average cost [and range] for a treatment of Chloroquine tablets for a two-year-old child	30 XOF (19–45)	53 XOF (30–64)	27 XOF (19–45)	31 XOF (7–75)	(7–75)
38 Average cost [and range] for a treatment of S/P tablets for a two-year-old-child	272 XOF (200–300)	224 XOF (176–429)		134 XOF (176–166)	(166–429)

Part III. Indicators of Stock Movement

39 Most commonly sold or dispensed drugs for pneumonia in children	amoxicillin	Theralene	co-trimoxazole	Pectol Kilpane	
40 Percentage of providers mentioning co-trimoxazole as the most commonly sold or dispensed drug for pneumonia	24%	0%	16%	0%	10%
41 Percentage of outlets mentioning amoxicillin as the most commonly sold or dispensed drug for pneumonia	31%	25%	0%	3%	14%
42 Average sales volume of co-trimoxazole	2.4	0	3.5	0	
43 Average sales volume of amoxicillin	9.3	5.3	0		
44 Ratio of the sales volume of amoxicillin to co-trimoxazole	3.8	N/A	N/A	N/A	N/A
45 Most commonly sold or dispensed drugs for diarrhea in children	ORS	metronidazole	ORS	tetracycline	
46 Percentage of outlets mentioning ORS as the most commonly sold or dispensed drug for diarrhea in children	45%	0%	43%	0%	22%
47 Percentage of outlets mentioning an antidiarrheal as the most commonly sold or dispensed drug for diarrhea in children	16%	59%	13%	9%	24%

Indicators	Type of Provider				All N = 133
	Health Facilities	Pharmacies	Health Huts	Other Vendors	
	n = 38	n = 32	n = 30	n = 33	
48 Most commonly sold or dispensed drugs for malaria in children	chloroquine	chloroquine	chloroquine	chloroquine	
49 Percentage of providers mentioning chloroquine as the most commonly sold or dispensed	84%	75%	87%	57%	75%
50 Percentage of outlets mentioning S/P as the most commonly sold or dispensed	0%	0%	0%	0%	N/A
51 Average sales volume of chloroquine	44.6	34.9	17.4	8.2	27
52 Average sales volume of S/P	0	0	0	0	N/A
53 Ratio of the sales volume of the S/P to chloroquine	N/A	N/A	N/A	N/A	N/A
Part IV. Indicators of Quality of Dispensing					
54 Percentage of providers dispensing loose tablets that use appropriate packaging	86%	97%	64%	43%	72%
55 Percentage of providers that dispense tablets with a label of the instructions (dose, frequency, and duration of treatment)	53%	28%	43%	9%	
Percentage of providers that dispense tablets with a label containing patient name, drug name, dose, frequency, and duration	0%	0%	0%	0%	N/A
56 Percentage of providers that use appropriate packaging to dispense syrup or suspension	100%	100%	100%	100%	100%
57 Percentage of providers that dispense syrups with a label of the instructions (dose, frequency, and duration of treatment)	55%	28%	42% (n = 26)	15% (n = 13)	
Percentage of providers that dispense syrups with a label containing patient name, drug name, dose, frequency, and duration	0%	0%	0%	0%	N/A

Indicators	Type of Provider				All N = 133
	Health Facilities n = 38	Pharmacies n = 32	Health Huts n = 30	Other Vendors n = 33	
Part V. Sources of Supply of Drugs					
58	Percentage of providers who procure drugs from the following sources:				
	Private wholesaler	5%	94%	0%	6%
	Health center or health post	13%	0%	27%	3%
	District store	60%	0%	73%	9%
	Central or regional store	26%	0%	0%	0%
	Private pharmacy	2%	6%	0%	15%
	Boutique or market		0%	0%	39%
	NGO		0%	0%	
	Other				36%
59	Percentage of providers who procure drugs from the following towns:				
	Kaolack	89%	96%	100%	51%
	Touba				21%
	Gambia				9%
	Dakar	3%			6%
	Other	8%			12%

Results from the Drug Providers: Thiès

Indicator	Type of Provider				All N = 130
	Health Facilities n = 46	Pharmacies n = 28	Health Huts n = 33	Other Vendors n = 23	
Description of the Sample					
a. Distribution of the outlets surveyed as % of total sample	36%	21%	26%	17%	
b. Distribution of the outlets surveyed in an urban milieu	72%	82%	6%	14%	47%
Distribution of Drug Outlets Attendants Based on Level of Training					
Pharmacist	2%	64%			16%
Medical doctor	15%				4%
Nurse, nurse midwife	68%		6%		18%
Medical technician, lab technician	6%				2%
Other health related training	11%	36%	94%	4%	36%
Percentage of attendants with NO training in clinical care				95%	24%
Drug outlets' distance from the nearest health facility					
Under 1 km (or less than 15 minutes walking)		90%	24%	54%	42%
Between 1 and 5 km (up to one hour walking)		7%	56%	32%	24%
More than 5 km (more than one hour walking)		4%	20%	14%	9%
Part I. Indicators of Reported Treatment Practices for Specific Hypothetical Cases					
ARI (non-pneumonia)					
1 Percentage of respondents who report they would recommend an antibiotic for children with symptoms of non-pneumonia ARI	44%	39%	3%	0%	22%
2 Percentage of respondents who report they would recommend the key STG drug for children with symptoms of non-pneumonia ARI	53%	18%	3%	0%	18%
3 Percentage of providers who would recommend nothing for children with symptoms of non-pneumonia ARI	15%	0	3%	43%	
4 Percentage of providers who would refer the case	2%	11%	39%	43%	
Pneumonia					
5 Percentage of respondents who report they would recommend an antibiotic for children with symptoms of pneumonia	39%	0%	3%	0%	10%

Indicator	Type of Provider				All N = 130
	Health Facilities n = 46	Pharmacies n = 28	Health Huts n = 33	Other Vendors n = 23	
6 Percentage of respondents who report they would recommend an injection for children with symptoms of pneumonia	0%	0%	0%	0%	N/A
7 Percentage of respondents who report they would recommend co-trimoxazole for children with symptoms of pneumonia	23%	0%	3%	0%	6%
8 Percentage of respondents who would refer the case	37%	89%	88%	48%	
9 Percentage of respondents who mentioned the recommended daily dosing regimen for co-trimoxazole for pneumonia in children	21%	0%	0%	0%	5%
10 Percentage of respondents who mentioned the recommended duration for co-trimoxazole for pneumonia in children	20%	0%	3%	0%	6%
Malaria					
11 Percentage of respondents who report they would recommend any antimalarial for children with symptoms of malaria	97%	78%	63%	4%	60%
12 Percentage of respondents who report they would recommend an antibiotic for children with symptoms of malaria	6%	10%	0%	0%	4%
13 Percentage of respondents who report they would recommend an injection for children with symptoms of malaria	6%	2%	0%	0%	2%
14 Percentage of respondents who report they would recommend chloroquine for children with symptoms of malaria	83%	67%	61%	4%	54%
15 Percentage of respondents who would refer the case	0	4%	27%	43%	
16 Percentage of respondents who mentioned the recommended daily dosing regimen for chloroquine for malaria in children	22%	7%	27%	0%	14%
17 Percentage of respondents who mentioned the recommended treatment duration for chloroquine for malaria in children	49%	63%	44%	0%	39%
Diarrhea					
18 Percentage of respondents who report they would recommend an antibiotic for a child with mild diarrhea	21%	22%	3%	18%	16%
19 Percentage of respondents who report they would recommend an antidiarrheal drug for a child with mild diarrhea	15%	59%	6%	0%	20%
20 Percentage of respondents who report they would recommend ORS for a child with mild diarrhea	85%	42%	82%	5%	54%

Indicator	Type of Provider				All N = 130
	Health Facilities	Pharmacies	Health Huts	Other Vendors	
	n = 46	n = 28	n = 33	n = 23	
21 Percentage of respondents who report they would recommend only ORS a child with mild diarrhea	47%	7%	76%	4%	34%
22 Percentage of respondents who would refer the case	6%	18%	12%	35%	
Part II. Indicators of Availability					
23 Percentage of outlets with a specific first-line drug in stock					
Chloroquine tablets	85%	96%	59%	41%	70%
Chloroquine syrup	79%	96%	44%	5%	56%
Co-trimoxazole tablets	79%	86%	12%	23%	50%
Co-trimoxazole syrup	66%	90%	9%	0%	41%
ORS	38%	0%	3%	0%	10%
24 Percentage of outlets with a specific second/third-line drug in stock					
Amoxicillin capsules	77%	100%	6%	0%	46%
Amoxicillin syrup	55%	100%	6%	0%	40%
Quinine injection	85%	75%	15%	0%	43%
S/P tablets	36%	89%	0%	0%	31%
25 Percentage of outlets with specific inappropriate drugs for child health available					
Actapulgit sachet	8%	100%	0%	0%	27%
Augmentin syrup	6%	93%	0%	0%	25%
Artesunate tablets	0%	96%	0%	0%	24%
Cefadroxil syrup	6%	82%	0%	0%	22%
Metronidazole syrup	49%	96%	12%	0%	39%
Tetracycline capsules	68%	7%	12%	64%	38%
Ultralevure sachets	4%	89%	0%	0%	23%
Halfan tablets	0%	89%	0%	0%	22%
26 Percentage of outlets with co-trimoxazole tablets but no syrup	15%	0.4%	3%	0%	4.6%
27 Percentage of outlets with chloroquine tablets but no syrup	4%	0%	0%	0%	1%
28 Percentage of outlets that have amoxicillin for pneumonia but not co-trimoxazole	11%	0.4%	0%	0%	3%
29 Percentage of outlets with antidiarrheal but no ORS available in stock	4%	96%	0%	0%	25%
30 Percentage of outlets that have S/P but no chloroquine	15%	0%	6%	0%	5%
31 Average cost [and range] for a treatment of co-trimoxazole syrup for a two-year-old child	486 XOF (120–2437)	1378 XOF (1005–2445)	765 XOF (622–998)		(120–2445)
32 Average cost [and range] for a treatment of amoxicillin syrup for a two-year-old child	368 XOF (90–1252)	1168 XOF (510–1774)	718 XOF (622–878)		(90–1773)

Indicator	Type of Provider				All N = 130
	Health Facilities n = 46	Pharmacies n = 28	Health Huts n = 33	Other Vendors n = 23	
33 Average cost [and range] for a treatment of co-trimoxazole tablets for a two-year-old child	167 XOF (130–800)	1169 XOF (1017–2190)	155 XOF (150–250)	220 XOF (200–250)	(130–2190)
34 Average cost [and range] for a treatment of amoxicillin tablets for a two-year-old child	528 XOF (225–1650)	1256 XOF (952–2548)	700 XOF (600–750)		(225–2548)
35 Average cost [and range] for a treatment of ORS in a two- year old child	35 XOF (50–200)		100 XOF (100–100)		(50–100)
36 Average cost [and range] for a treatment of chloroquine syrup for a two-year old child	203 XOF (187–626)	432.11 XOF (315–1057)	229.5 XOF (187–281)	281 XOF (281–281)	(187–1057)
37 Average cost [and range] for a treatment of chloroquine tablets for a two-year old child	21 XOF (15–150)	68 XOF (56 –260)	27 XOF (18–45)	40 XOF (30–60)	(15–260)
38 Average cost [and range] for a treatment of S/P tablets for a two-year-old child	47 XOF (8–267)	292 XOF (53–430)			(8–430)

Part III. Indicators of Stock Movement

39 Most commonly sold or dispensed drugs for pneumonia in children	co-trimoxazole	Pneumorel	Nivaquine		
40 Percentage of providers mentioning co-trimoxazole as the most commonly sold or dispensed drug for pneumonia	51%	0%			16.9%
41 Percentage of outlets mentioning amoxicillin as the most commonly sold or dispensed drug for pneumonia	29%	10%			10%
42 Average sales volume of co-trimoxazole	6.6				58.7
43 Average sales volume of amoxicillin	3.1				28.6
44 Ratio of the sales volume of amoxicillin to co-trimoxazole	0.5				0.5
45 Most commonly sold or dispensed drugs for diarrhea in children	ORS	Ricridene	ORS	tetracycline	
46 Percentage of outlets mentioning ORS as the most commonly sold or dispensed drug for diarrhea in children	47%	0%	68%	0%	
47 Percentage of outlets mentioning an antidiarrheal as the most commonly sold or dispensed drug for diarrhea in children	10%	85%	0%	0%	
48 Most commonly sold or dispensed drugs for malaria in children	chloroquine	chloroquine	chloroquine	aspirin	
49 Percentage of providers mentioning chloroquine as the most commonly sold or dispensed	89%	78%	77%	13%	64%
50 Percentage of outlets mentioning S/P as the most commonly sold or dispensed	0%	7%	7%	0%	
51 Average sales volume of chloroquine	15	15	7.2	0.7	10.5

		Type of Provider				All
		Health Facilities	Pharmacies	Health Huts	Other Vendors	
Indicator		n = 46	n = 28	n = 33	n = 23	N = 130
52	Average sales volume of S/P	0	0	0	0	
53	Ratio of the sales volume of the S/P to chloroquine		N/A	N/A	N/A	
Part IV. Indicators of Quality of Dispensing						
54	Percentage of providers dispensing loose tablets that use appropriate packaging	80%	96%	52%	61%	72%
55	Percentage of providers that dispense tablets with a label of the instructions (dose, frequency, and duration of treatment)	17%	29%	28%	4%	
	Percentage of providers dispense tablets with a label containing patient name, drug name, dose, frequency, and duration	0%	0%	0%	0%	
56	Percentage of providers that use appropriate packaging to dispense syrup or suspension	97%	100%	55%	100%	88%
57	Percentage of providers that dispense syrups with a label of the instructions (dose, frequency, and duration of treatment)	20% (n = 40)	29% (n = 28)	7% (n = 28)	50% (n = 2)	
	Percentage of providers that dispense syrups with a label containing patient name, drug name, dose, frequency, and duration	0%	0%	0%	0%	
Part V. Sources of Supply of Drugs						
58	Percentage of providers who procure drugs from the following sources:					
	Private wholesaler		100%	0%	0%	
	Health center or health post	4%	0%	12%	4%	
	District store	60%	0%	38%	0%	
	Central or regional store	17%	0%	3%	0%	
	Private pharmacy	4%	0%	9%	13%	
	Boutique or market	2%	0%	3%	77%	
	NGO	2%	0%	32%		
59	Percentage of providers who procure drugs from the following towns:					
	Thiès	60%	100%	70%	23%	
	Touba			3%	4%	
	Gambia					
	Dakar	17%	60%	9%	9%	
	Other	12%	7%	12%	45%	

